

**SAF-RC-020**  
**100-BC Burial Grounds –**  
**Soil Full Protocol**  
**FINAL VALIDATION PACKAGE**

**COMPLETE COPY OF VALIDATION PACKAGE TO:**

Jeanette Duncan (2) H9-02

\_\_\_\_\_  
INITIAL/DATE

**COMMENTS:**

**SDG K0197A      SAF-RC-020**

**Waste Site: 100-B-20**

**RECEIVED**  
APR 24 2006

**EDMC**

Date: 16 March 2006  
To: Washington Closure Hanford Inc. (technical representative)  
From: TechLaw, Inc.  
Project: 100-BC Burial Grounds – Soil Full Protocol - Waste Site 100-B-20  
Subject: Semivolatile - Data Package No. K0197A-LLI

## **INTRODUCTION**

This memo presents the results of data validation on Data Package No. K0197A prepared by Lionville Laboratory Inc. (LLI). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Date
J10V68	1/18/06	Soil	C	See note 1

1 – Semivolatiles by 8270C.

Data validation was conducted in accordance with the Bechtel Hanford Incorporated (BHI) validation statement of work and the 100 Area Remedial Action Sampling and Analysis Plan (DOE/RL-96-22, February 2005). Appendices 1 through 5 provide the following information as indicated below:

- Appendix 1. Glossary of Data Reporting Qualifiers
- Appendix 2. Summary of Data Qualification
- Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
- Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
- Appendix 5. Data Validation Supporting Documentation

## **DATA QUALITY OBJECTIVES**

### **• Holding Times**

Analytical holding times were assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Samples must be extracted within 14 days of the date of sample collection and analyzed within 40 days from the date of extraction.

If holding times are exceeded, but not by greater than two times the limit, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If holding times are exceeded by greater than two times the limit, all associated detectable sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR".

All holding times were met.

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## • Method Blanks

Method blank analyses are conducted to determine the extent of laboratory contamination introduced through sampling, sample preparation and analysis. At least one acceptable method blank analysis must be conducted for every 20 samples. No contaminants should be present in the method blank. Analytical results for analytes present in any sample at less than five times the concentration of that analyte found in the associated blank are qualified as non-detects and flagged "U". Common laboratory contaminants present in samples at less than ten times the concentration of that analyte found in the associated blank are qualified as non-detects. If a sample result is less than the CRQL and is less than five times (or less than ten times for lab contaminants) the highest associated blank result, the sample result value is raised to the CRQL level and qualified as undetected "U".

All method blank results were acceptable.

## Field Blanks

No field blanks were submitted for analysis.

## • Accuracy

### Matrix Spike/Matrix Spike Duplicate & Blank Spike Recoveries

Matrix spike/matrix spike duplicate analyses are used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike/matrix spike duplicate analyses are performed in duplicate using five compounds for which percent recoveries must be within a range of 50-150% or within laboratory control limits. If spike recoveries are outside control limits, detected sample results less than five times the spike concentration are qualified as estimates and flagged "J". Undetected sample results with spike recoveries below control limits are qualified as estimates and flagged "UJ". Undetected sample results are not qualified if the spike recovery is above control limits. Sample results greater than five times the spike concentration require no qualification.

Due to the matrix spike and matrix spike duplicate being diluted out, all hexachlorocyclopentadiene, 2,4-dinitrophenol, 4-nitrophenol and 4,6-dinitro-2-methylphenol results were qualified as estimates and flagged "J".

Due to a matrix spike duplicate (45%) recovery outside QC limits, all phenol results were qualified as estimates and flagged "J".

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Due to a matrix spike duplicate (45%) recovery outside QC limits, all 3-nitroaniline results were qualified as estimates and flagged "J".

Due to matrix spike (42%) and matrix spike duplicate (47%) recoveries outside QC limits, all 4-nitroaniline results were qualified as estimates and flagged "J".

All other accuracy results were acceptable.

#### Surrogate Recovery

The analyses of surrogate compounds provide a measure of performance for individual samples. Matrix-specific surrogate compound recovery control windows have been established by the EPA CLP program. If two surrogates of the same class of compounds (base/neutral or acid) are out of control limits, all associated sample results greater than the contract required quantitation limit (CRQL) are qualified as estimates and flagged "J". Sample results less than the CRQL and below the lower control limit are qualified as estimates and flagged "UJ". Sample results less than the CRQL with recoveries above the upper control limit require no qualification. If a surrogate recovery is less than 10%, detects are qualified as estimates and flagged "J" and nondetects are rejected and flagged "UR".

All surrogate results were acceptable.

#### **• Precision**

##### Matrix Spike/Matrix Spike Duplicate Samples

Matrix spike (MS)/matrix spike duplicate (MSD) results provide matrix-specific information on the precision of the method for specific target compound classes. Precision is expressed by the relative percent difference (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample. Samples results must be within RPD limits of  $\pm 30\%$ . If RPD values are out of specification and the sample concentration is less than five times the spike concentration, all associated detected sample results are qualified as estimates and flagged "J". If RPD values are out of specification and the sample concentration is greater than five times the spike concentration, no qualification is required.

Due to an RPD outside QC limits (113%), all 4-chloroaniline results were qualified as estimates and flagged "J".

Due to an RPD outside QC limits (45%), all 2-nitroaniline results were qualified as estimates and flagged "J".

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Due to an RPD outside QC limits (36%), all diethylphthalate results were qualified as estimates and flagged "J".

Due to the matrix spike and matrix spike duplicate being diluted out, all hexachlorocyclopentadiene, 2,4-dinitrophenol, 4-nitrophenol and 4,6-dinitro-2-methylphenol results were qualified as estimates and flagged "J".

All other precision results were acceptable.

#### Field Duplicate Samples

No field duplicates were submitted for analysis.

#### • **Analytical Detection Levels**

Reported analytical detection levels are compared against the required quantitation limits (RQL's) to ensure that laboratory detection levels meet the required criteria. All undetected analytes exceeded the RQL. Under the WCH statement of work, no qualification is required.

#### • **Completeness**

Data package No. K0197A-LLI was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

#### **MAJOR DEFICIENCIES**

None found.

#### **MINOR DEFICIENCIES**

The following minor deficiencies were noted:

- Due to the matrix spike and matrix spike duplicate being diluted out, all hexachlorocyclopentadiene, 2,4-dinitrophenol, 4-nitrophenol and 4,6-dinitro-2-methylphenol results were qualified as estimates and flagged "J".
- Due to a matrix spike duplicate (45%) recovery outside QC limits, all phenol results were qualified as estimates and flagged "J".

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- Due to a matrix spike duplicate (45%) recovery outside QC limits, all 3-nitroaniline results were qualified as estimates and flagged "J".
- Due to matrix spike (42%) and matrix spike duplicate (47%) recoveries outside QC limits, all 4-nitroaniline results were qualified as estimates and flagged "J".
- Due to an RPD outside QC limits (113%), all 4-chloroaniline results were qualified as estimates and flagged "J".
- Due to an RPD outside QC limits (45%), all 2-nitroaniline results were qualified as estimates and flagged "J".
- Due to an RPD outside QC limits (36%), all diethylphthalate results were qualified as estimates and flagged "J".

Data flagged "J" indicates that the associated concentration is an estimate, but under the BHI statement of work, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

All undetected analytes exceeded the RQL. Under the WCH statement of work, no qualification is required.

## REFERENCES

WCH, Contract #20266, *Validation Statement of Work*, Washington Closure Hanford Incorporated, July 7, 2003.

DOE/RL-96-22, Rev. 4, *100 Area Remedial Action Sampling and Analysis Plan*, U.S. Department of Energy, February 2005.

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## **Appendix 1**

### **Glossary of Data Reporting Qualifiers**

**000006**

Qualifiers which may be applied by data validators in compliance with the BHI validation SOW are as follows:

- U - Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the same quantitation limit corrected for sample dilution and moisture content by the laboratory.
- UU - Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- J - Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- R - Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.
- UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.
- NJ - Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).
- N - Indicates presumptive evidence of a compound. The data may not be valid for some specific applications usable for decision-making purposes).

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**Appendix 2**  
**Summary of Data Qualification**

**000008**

## SEMIVOLATILE DATA QUALIFICATION SUMMARY\*

SDG: K0197A	REVIEWER: JLS	DATE: 1008-20	PAGE: 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Hexachlorocyclopentadiene 2,4-dinitrophenol 4-nitrophenol 4,6-dinitro-2-methylphenol	J	All	MS/MSD diluted out
Phenol 3-nitroaniline 4-nitroaniline	J	All	MS or MSD recovery
Diethylphthalate 4-chloroaniline 2-nitroaniline	J	All	RPD

\* - The Qualified Data Summary Table includes laboratory applied "U" qualifiers not specifically identified here. The laboratory applied "U" qualifiers are included to minimize misinterpretation of results contained in the table.

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### **Appendix 3**

#### **Qualified Data Summary and Annotated Laboratory Reports**

**000010**

Project: WASHINGTON CLOSURE HANFORD											
Laboratory: LLI				SDG: K0197A							
Sample Number				J10V68			J10V68				
Remarks											
Sample Date				1/18/06			1/18/06				
Extraction Date				1/24/06			1/24/06				
Analysis Date				2/3/06			2/3/06				
Semivolatiles (8270C)		RQL	Result	Q	Result	Q	Semivolatiles (8270C)		RQL	Result	Q
Phenol	660	54000	J				3-Nitroaniline*	660	820000	UJ	
bis(2-Chloroethyl)ether	660	330000	U				Acenaphthene	660	330000	U	
2-Chlorophenol	660	330000	U				2,4-Dinitrophenol*	660	820000	UJ	
1,3-Dichlorobenzene	660	330000	U				4-Nitrophenol*	660	820000	UJ	
1,4-Dichlorobenzene	660	330000	U				Dibenzofuran	660	330000	U	
1,2-Dichlorobenzene	660	330000	U				2,4-Dinitrotoluene	660	330000	U	
2-Methylphenol	660	330000	U				Diethylphthalate	660	330000	UJ	
2,2'-oxybis(1-chloropropane)	660	330000	U				4-Chlorophenyl-phenyl ether	660	330000	U	
4-Methylphenol	660	41000					Fluorene	660	330000	U	
N-Nitroso-di-n-propylamine	660	330000	U				4-Nitroaniline*	660	820000	UJ	
Hexachloroethane	660	330000	U				4,6-Dinitro-2-methylphenol*	660	820000	UJ	
Nitrobenzene	660	330000	U				N-Nitrosodiphenylamine	660	330000	U	
Isophorone	660	330000	U				4-Bromophenyl-phenyl ether	660	330000	U	
2-Nitrophenol	660	330000	U				Hexachlorobenzene	660	330000	U	
2,4-Dimethylphenol	660	330000	U				Pentachlorophenol*	660	820000	U	
bis(2-Chloroethoxy)methane	660	330000	U				Phenanthrene	660	17000		
2,4-Dichlorophenol	660	330000	U				Anthracene	660	330000	U	
1,2,4-Trichlorobenzene	660	330000	U				Carbazole	660	330000	U	
Naphthalene	660	61000					Di-n-butylphthalate	660	330000	U	
4-Chloroaniline	660	330000	UJ				Fluoranthene	660	330000	U	
Hexachlorobutadiene	660	330000	U				Pyrene	660	19000		
4-Chloro-3-methylphenol	660	330000	U				Butylbenzylphthalate	660	330000	U	
2-Methylnaphthalene	660	120000					3,3'-Dichlorobenzidine	660	330000	U	
Hexachlorocyclopentadiene	660	330000	UJ				Benzo(a)anthracene	660	330000	U	
2,4,6-Trichlorophenol	660	330000	U				Chrysene	660	330000	U	
2,4,5-Trichlorophenol*	660	820000	U				bis(2-Ethylhexyl)phthalate	660	34000		
2-Chloronaphthalene	660	330000	U				Di-n-octylphthalate	660	19000		
2-Nitroaniline*	660	820000	UJ				Benzo(b)fluoranthene	660	330000	U	
Dimethylphthalate	660	330000	U				Benzo(k)fluoranthene	660	330000	U	
Acenaphthylene	660	330000	U				Benzo(a)pyrene	660	330000	U	
2,6-Dinitrotoluene	660	330000	U				Indeno(1,2,3-cd)pyrene	660	330000	U	
							Dibenz(a,h)anthracene	660	330000	U	
							Benzo(g,h,i)perylene	660	330000	U	

Laboratory applied non-detect qualifiers "U" have been included in this table to minimize miss-interpretation of results.

All other qualifiers shown were applied during validation.

\* - RQL exceeded

000011



Cust ID:	J10V68	J10V68	J10V68	SBLKTA	SBLKTA BS
RFW#:	001	001 MS	001 MSD	06LE0062-MB1	06LE0062-MB1
2-Chloronaphthalene	330000 U	76 %	88 %	330 U	99 %
2-Nitroaniline	820000 U J	109 %	69 %	830 U	97 %
Dimethylphthalate	330000 U	79 %	88 %	330 U	102 %
Acenaphthylene	330000 U	78 %	80 %	330 U	95 %
2,6-Dinitrotoluene	330000 U	66 %	80 %	330 U	99 %
3-Nitroaniline	820000 U J	52 %	45 * %	830 U	119 %
Acenaphthene	330000 U	75 %	81 %	330 U	98 %
2,4-Dinitrophenol	820000 U J	D %	D %	830 U	28 %
4-Nitrophenol	820000 U J	D %	D %	830 U	98 %
Dibenzofuran	330000 U	82 %	83 %	330 U	103 %
2,4-Dinitrotoluene	330000 U	63 %	69 %	330 U	110 %
Diethylphthalate	330000 U J	260 * %	180 * %	330 U	102 %
4-Chlorophenyl-phenylether	330000 U	83 %	80 %	330 U	102 %
Fluorene	330000 U	86 %	86 %	330 U	99 %
4-Nitroaniline	820000 U J	42 * %	47 * %	830 U	99 %
4,6-Dinitro-2-methylphenol	820000 U J	D %	D %	830 U	91 %
N-Nitrosodiphenylamine (1)	330000 U	88 %	98 %	330 U	89 %
4-Bromophenyl-phenylether	330000 U	87 %	91 %	330 U	93 %
Hexachlorobenzene	330000 U	101 %	106 %	330 U	106 %
Pentachlorophenol	820000 U	70 %	53 %	830 U	97 %
Phenanthrene	17000 U	91 %	93 %	330 U	100 %
Anthracene	330000 U	84 %	93 %	330 U	102 %
Carbazole	330000 U	73 %	91 %	330 U	102 %
Di-n-butylphthalate	330000 U	89 %	102 %	330 U	112 %
Fluoranthene	330000 U	89 %	85 %	330 U	111 %
Pyrene	19000 J	64 %	83 %	330 U	98 %
Butylbenzylphthalate	330000 U	124 %	124 %	330 U	104 %
3,3'-Dichlorobenzidine	330000 U	91 %	103 %	330 U	99 %
Benzo(a)anthracene	330000 U	79 %	91 %	330 U	100 %
Chrysene	330000 U	95 %	94 %	330 U	99 %
bis(2-Ethylhexyl)phthalate	34000 JB	103 %	104 %	73 J	106 %
Di-n-octyl phthalate	19000 J	69 %	66 %	330 U	99 %
Benzo(b)fluoranthene	330000 U	89 %	101 %	330 U	96 %
Benzo(k)fluoranthene	330000 U	92 %	119 %	330 U	96 %
Benzo(a)pyrene	330000 U	88 %	90 %	330 U	94 %
Indeno(1,2,3-cd)pyrene	330000 U	94 %	103 %	330 U	107 %
Dibenz(a,h)anthracene	330000 U	93 %	110 %	330 U	110 %
Benzo(g,h,i)perylene	330000 U	125 %	116 %	330 U	101 %

(1) - Cannot be separated from Diphenylamine. \*= Outside of EPA CLP QC limits.

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000013

K 3/10/01

## **Appendix 4**

### **Laboratory Narrative and Chain-of-Custody Documentation**

**000014**



## Case Narrative

Client: TNU-HANFORD RC-020  
LVL #: 0601L127  
SDG/SAF # K0197/RC-020

W.O. #: 11343-606-001-9999-00  
Date Received: 01-20-2006

### SEMIVOLATILE

One (1) soil sample was collected on 01-18-2006.

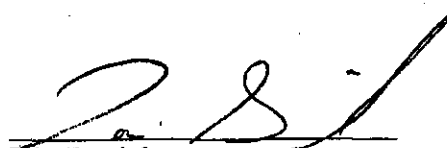
The sample and its associated QC samples were extracted according to Lionville Laboratory SOPs based on SW 846 method 3540C on 01-24-2006 and analyzed according to criteria set forth in Lionville Laboratory SOPs based on SW 846 Method 8270C for TCL Semivolatile target compounds on 01-25-2006 and 02-03-2006.

The following is a summary of the QC results accompanying the sample results and a description of any problems encountered during their analyses:

1. All results presented in this report are derived from a sample that met LvLI's sample acceptance policy.
2. The sample was extracted and analyzed within required holding time.
3. Non-target compounds were detected in the sample.
4. The sample and its associated matrix spike samples required a 5-fold dilution due to high levels of non-target compounds. The summary report does not reflect the correct dilution factor due to the programming limitation. The sample was extracted using reduced (2g) sample volume due to the nature of the sample matrix and analyzed using 10mL final volume due to dark and viscous nature of the extract resulting in higher reporting limits for the sample. A copy of the Sample Extraction Record has been enclosed for more information.
5. All surrogate recoveries were within acceptance criteria.
6. Fifteen (15) of one hundred twenty (120) obtainable matrix spike recoveries were outside acceptance criteria.
7. All blank spike recoveries were within acceptance criteria.
8. The method blank contained the common laboratory contaminant Bis (2-Ethylhexyl) phthalate at a level less than the CRQL.

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 15 pages.

9. Internal standard area and retention time criteria were met.
10. Manual integrations are performed according to SOP QA-125 to produce quality data with the utmost integrity. All manual integrations are required to be technically valid and properly documented. Appropriate technical flags are defined in the Glossary ("Technical Flags For Manual Integration").
11. LvLI is NELAP accredited by the state of Pennsylvania and holds over 20 additional state accreditations. For a complete listing of accrediting authorities and the corresponding analytes/methods, please contact your Project Manager.
12. I certify, that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data, contained in this hard-copy data package, has been authorized, by the Laboratory Manager or a designee, as verified by the following signature.

  
Iain Daniels  
Laboratory Manager  
Lionville Laboratory Incorporated

2/8/06  
Date

som\group\data\bna\mu-hanford\0602-127.doc



000016

00000003

# Lionville Laboratory Sample Discrepancy Report (SDR)

SDR #: 06 MS039

Initiator: Sham Taylor  
Date: 2-3-06  
Client: THU

Batch: 06 014127  
Samples: 00/ins 00/insd  
Method: SWB46/MCAWW/CLP/

Parameter: 8270  
Matrix: SOLIO  
Prep Batch: 06LE0062

## 1. Reason for SDR

a. COC Discrepancy ☐ Tech Profile Error ☐ Client Request ☐ Sampler Error on C-O-C  
☐ Transcription Error ☐ Wrong Test Code ☐ Other

## b. General Discrepancy

☐ Missing Sample/Extract ☐ Container Broken ☐ Wrong Sample Pulled ☐ Label ID's Illegible  
☐ Hold Time Exceeded ☐ Insufficient Sample ☐ Preservation Wrong ☐ Received Past Hold  
☐ Improper Bottle Type ☐ Not Amenable to Analysis

Note: Verified by [Log-In] or [Prep Group] (circle)...signature/date: \_\_\_\_\_

## c. Problem (Include all relevant specific results; attach data if necessary)

*low recovery of several analytes in the matrix spike & matrix spiked up but the blank spike is ok*

## 2. Known or Probable Causes(s)

*loss during extraction & sample matrix effects*

## 3. Discussion and Proposed Action

Other Description:

☐ Re-log  
☐ Entire Batch  
☐ Following Samples: \_\_\_\_\_  
☐ Re-leach  
☐ Re-extract  
☐ Re-digest  
☐ Revise EDD  
☐ Change Test Code to \_\_\_\_\_  
☐ Place On/Take Off Hold (circle)

*narrate*

## 4. Project Manager Instructions...signature/date:

☒ Concur with Proposed Action  
☐ Disagree with Proposed Action; See Instruction  
☐ Include in Case Narrative  
☐ Client Contacted:  
Date/Person \_\_\_\_\_  
☐ Add  
☐ Cancel

## 5. Final Action...signature/date:

Other Explanation:

☒ Verified re-[log][leach][extract][digest][analysis] (circle)  
☒ Included in Case Narrative  
☐ Hard Copy COC Revised  
☐ Electronic COC Revised  
☐ EDD Corrections Completed

When Final Action has been recorded, forward original to QA Specialist for distribution and filing.

## Route Distribution of Completed SDR

☒ Initiator  
☒ Lab General Manager: M. Taylor  
☒ Project Mgr: Stone/Johnson  
☐ Data Management: Stowell  
☐ Sample Prep: Beegle/Kiger

## Route Distribution of Completed SDR

☐ Metals: Beegle  
☐ Inorganic: Perrone  
☐ GC/LC: Kiger  
☒ MS: Rychlak/Daley  
☐ Log-In: Perry  
☐ Admin: \_\_\_\_\_  
☐ Other: \_\_\_\_\_

Washington Closure Hanford		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST								RC-020-004		Page 1 of 21	
Collector Doug Bowers/C. Martinez		Company Contact Doug Bowers		Telephone No. 509-531-0701		Project Coordinator KESSNER, JH		Price Code		Data Turnaround			
Project Designation 100-BC Burial Grounds - Soil Full Protocol		Sampling Location 100-B-20 (1716-B Maint Garage UST)		SAF No. RC-020		Air Quality		14 day					
Ice Chest No. AFS-04-049		Field Logbook No. EFL-1173-7		COA C11BXY A 000		Method of Shipment Fed ex		Bill of Lading/Air Bill No.		See USPC			
Shipped To EBERLINE SERVICES <u>LIONVILLE</u>		Offsite Property No. A060224		Shipping C11BXY 6760									
POSSIBLE SAMPLE HAZARDS/REMARKS none < DOT Limits		Preservation		None	Cool 4C	Cool 4C	Cool 4C	4C Cool	none	none	oil		
Special Handling and/or Storage Cool 4 degrees centigrade		Type of Container		G/P	aG	aG	G	aG	G	G		18/06	
		No. of Container(s)		1	1	1	1	1	1	1			
		Volume		250g 1 L	250ml 1 L	250ml 1 L	250ML 1 L	250ml 1 L	250ml 1 L	250ml 1 L	1 L		
SAMPLE ANALYSIS		See Item (1) in Special Instructions		PCBs - 8082	Semi-VOA - 8270A (TCL)	TPH (Total) - 418.1	VOA - 8260A (TCL)	Ignitability - 1010	See Item (2)		01/18/06		
0000018													
Sample No.	Matrix *	Sample Date	Sample Time										
J10V68	SOIL	01/12/06	1400	✓	✓	✓	✓	✓	✓	✓			
J10V69	SOIL	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
J10V70	SOIL												
J10V71	SOIL												
J10V72	SOIL												
CHAIN OF POSSESSION				Sign/Print Names				SPECIAL INSTRUCTIONS				Matrix *	
Relinquished By/Removed From Doug Bowers		Date/Time 1-18-06/1745		Received By/Stored In A. J. 1728		Date/Time 1-18-06/1745		(1) ICP Metals - 6010 (Client List) (Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium, Silicon, Silver, Sodium, Vanadium, Zinc); Mercury - 7470 - (CV) (2) Metals by ICP (TCLP) - 1311/4010 (arsenic, barium, cadmium, chromium, lead, selenium, silver); mercury (TCLP) 1311/7470 01/18/06				S=Soil SE=Soil/Sediment SO=Solid SL=Sludge W=Water O=Oil A=Air OS=Organic Solids DL=Dry/Liquid T=Tissue W/W=Wipe L=Liquid V=Vegetation X=Other	
Relinquished By/Removed From R. J. 3728		Date/Time 1-19-06 1125		Received By/Stored In R. J. 3728		Date/Time 1-19-06							
Relinquished By/Removed From R. J. 3728		Date/Time 1-19-06 1500		Received By/Stored In Fed Ex		Date/Time 1-19-06							
Relinquished By/Removed From R. J. 3728		Date/Time 1-20-06 0940		Received By/Stored In R. J. 3728		Date/Time 1-20-06							
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time							
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time							
LABORATORY SECTION		Received By		Title				Date/Time					
FINAL SAMPLE DISPOSITION		Disposal Method		Disposed By				Date/Time					

## **Appendix 5**

### **Data Validation Supporting Documentation**

**000019**

## GC/MS ORGANIC DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	<u>C</u>	D	E
PROJECT:	100-B-20		DATA PACKAGE: K0197		
VALIDATOR:	TCT	LAB: LLT	DATE: 3/9/06		
			SDG: K0197		
ANALYSES PERFORMED					
SW-846 8260		SW-846 8260 (TCLP)	<u>SW-846 8270</u>		SW-846 8270 (TCLP)
SAMPLES/MATRIX					
J10068					
Soil					

## 1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Technical verification documentation present? ..... Yes No N/A

Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

## 2. INSTRUMENT TUNING AND CALIBRATION (Levels D and E)

GC/MS tuning/performance check acceptable? ..... Yes No N/AInitial calibrations acceptable? ..... Yes No N/AContinuing calibrations acceptable? ..... Yes No N/AStandards traceable? ..... Yes No N/AStandards expired? ..... Yes No N/ACalculation check acceptable? ..... Yes No N/A

Comments: \_\_\_\_\_

000020

## GC/MS ORGANIC DATA VALIDATION CHECKLIST

## 3. BLANKS (Levels B, C, D, and E)

Calibration blanks analyzed? (Levels D, E) ..... Yes No N/A  
 Calibration blank results acceptable? (Levels D, E) ..... Yes No N/A  
 Laboratory blanks analyzed? ..... Yes No N/A  
 Laboratory blank results acceptable? ..... Yes No N/A  
 Field/trip blanks analyzed? (Levels C, D, E) ..... Yes No N/A  
 Field/trip blank results acceptable? (Levels C, D, E) ..... Yes No N/A  
 Transcription/calculation errors? (Levels D, E) ..... Yes No N/A  
 Comments: no FB

## 4. ACCURACY (Levels C, D, and E)

Surrogates/system monitoring compounds analyzed? ..... Yes No N/A  
 Surrogate/system monitoring compound recoveries acceptable? ..... Yes No N/A  
 Surrogates traceable? (Levels D, E) ..... Yes No N/A  
 Surrogates expired? (Levels D, E) ..... Yes No N/A  
 MS/MSD samples analyzed? ..... Yes No N/A  
 MS/MSD results acceptable? ..... Yes No N/A  
 MS/MSD standards NIST traceable? (Levels D, E) ..... Yes No N/A  
 MS/MSD standards? (Levels D, E) ..... Yes No N/A  
 LCS/BSS samples analyzed? ..... Yes No N/A  
 LCS/BSS results acceptable? ..... Yes No N/A  
 Standards traceable? (Levels D, E) ..... Yes No N/A  
 Standards expired? (Levels D, E) ..... Yes No N/A  
 Transcription/calculation errors? (Levels D, E) ..... Yes No N/A  
 Performance audit sample(s) analyzed? ..... Yes No N/A  
 Performance audit sample results acceptable? ..... Yes No N/A

Comments: MSD - phenol 4590 MS/MSD - 4 nitroaniline - J all  
diluted at - 4 (hexachlorocyclopentadiene, 4 nitrophenol, 2,4 dinitrophenol  
+ 4,6 dinitro 2 methylphenol) - J all  
MSD - 3-methylphenol 3-nitroaniline - J all  
3/18/7  
no FB

000021

## GC/MS ORGANIC DATA VALIDATION CHECKLIST

## 5. PRECISION (Levels C, D, and E)

MS/MSD samples analyzed? ..... Yes No N/A  
MS/MSD RPD values acceptable? ..... Yes No N/A  
MS/MSD standards NIST traceable? (Levels D, E) ..... Yes No N/A  
MS/MSD standards expired? (Levels D, E) ..... Yes No N/A  
Field duplicate RPD values acceptable? ..... Yes No N/A  
Field split RPD values acceptable? ..... Yes No N/A  
Transcription/calculation errors? (Levels D, E) ..... Yes No N/A

Comments: 4 diluted out  
4-chloroaniline (113%) 2-nitroaniline (453%) diethylphthalate (36%) - Tell

## 6. SYSTEM PERFORMANCE (Levels D and E)

Internal standards analyzed? ..... Yes No N/A  
Internal standard areas acceptable? ..... Yes No N/A  
Internal standard retention times acceptable? ..... Yes No N/A  
Standards traceable? ..... Yes No N/A  
Standards expired? ..... Yes No N/A  
Transcription/calculation errors? ..... Yes No N/A

Comments:

## 7. HOLDING TIMES (all levels)

Samples properly preserved? ..... Yes No N/A  
Sample holding times acceptable? ..... Yes No N/A

Comments:

000022

## GC/MS ORGANIC DATA VALIDATION CHECKLIST

## 8. COMPOUND IDENTIFICATION, QUANTITATION, AND DETECTION LIMITS (all levels)

Compound identification acceptable? (Levels D, E) ..... Yes No N/A  
Compound quantitation acceptable? (Levels D, E) ..... Yes No N/A  
Results reported for all requested analyses? ..... Yes No N/A  
Results supported in the raw data? (Levels D, E) ..... Yes No N/A  
Samples properly prepared? (Levels D, E) ..... Yes No N/A  
Laboratory properly identified and coded all TIC? (Levels D, E) ..... Yes No N/A  
Detection limits meet RDL? ..... Yes No N/A  
Transcription/calculation errors? (Levels D, E) ..... Yes No N/A  
Comments: all undetected over

## 9. SAMPLE CLEANUP (Levels D and E)

GPC cleanup performed? ..... Yes No N/A  
GPC check performed? ..... Yes No N/A  
GPC check recoveries acceptable? ..... Yes No N/A  
GPC calibration performed? ..... Yes No N/A  
GPC calibration check performed? ..... Yes No N/A  
GPC calibration check retention times acceptable? ..... Yes No N/A  
Check/calibration materials traceable? ..... Yes No N/A  
Check/calibration materials Expired? ..... Yes No N/A  
Analytical batch QC given similar cleanup? ..... Yes No N/A  
Transcription/Calculation Errors? ..... Yes No N/A  
Comments: \_\_\_\_\_

000023

Date: 16 March2006  
To: Washington Closure Hanford Inc. (technical representative)  
From: TechLaw, Inc.  
Project: 100-BC Burial Grounds – Soil Full Protocol - Waste Site 100-B-20  
Subject: PCB - Data Package No. K0197A-LLI

## **INTRODUCTION**

This memo presents the results of data validation on Data Package No. K0197A prepared by Lionville Laboratory Inc. (LLI). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Date
J10V68	1/18/06	Soil	C	See note 1

1 – PCBs by 8082.

Data validation was conducted in accordance with the Washington Closure Hanford (WCH) validation statement of work and the 100 Area Remedial Action Sampling and Analysis Plan (DOE/RL-96-22, February 2005). Appendices 1 through 5 provide the following information as indicated below:

- Appendix 1. Glossary of Data Reporting Qualifiers
- Appendix 2. Summary of Data Qualification
- Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
- Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
- Appendix 5. Data Validation Supporting Documentation

## **DATA QUALITY OBJECTIVES**

### **• Holding Times**

Sample data were assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Soil samples must be extracted within 14 days of the date of sample collection and analyzed within 40 days from the date of extraction.

If holding times are exceeded by less than two times the limit, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If holding times are exceeded by greater than two times the limit, all associated detected sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR".

All holding times were acceptable.

000001

## • Method Blank

Method blank analyses are performed to determine the extent of laboratory contamination introduced through sampling, sample preparation or analysis. At least one method blank analysis must be conducted for every 20 samples. Method blanks should not contain target compounds at a concentration greater than required quantitation limit (RQL). If target compounds are present, sample results less than five times the blank concentration are qualified as undetected and flagged "U". If the sample result is less than five times the blank concentration and less than RQL, the result is qualified as undetected and elevated to the RQL.

All method blank results were acceptable.

## Field Blanks

No field blanks were submitted for analysis.

## • Accuracy

### Matrix Spike & Laboratory Control Sample

Matrix spike (MS) and laboratory control sample (LCS) analyses are used to assess the analytical accuracy of the reported data. The matrix spike is used to assess the effect of the matrix on the ability to accurately quantify sample concentrations. Recoveries must fall within the range of 70% to 130%. If spike recoveries are outside control limits, detected sample results less than five times the spike concentration are qualified as estimates and flagged "J". Non-detected sample results with spike recoveries outside control limits are qualified as estimates and flagged "UJ". Sample results greater than five times the spike concentration require no qualification.

Due to a matrix spike duplicate recovery outside QC limits (54%), all aroclor results (except aroclor-1260) were qualified as estimates and flagged "J".

All other accuracy results were acceptable.

### Surrogate Recovery

The analysis of surrogate compounds provides a measure of performance for individual samples. Matrix-specific surrogate compound recovery control windows have been established by the laboratory. When a surrogate compound recovery is outside the control window, all positively identified target compounds associated with the unacceptable surrogate recoveries are qualified as estimates and flagged

000002

"J". Non-detected compounds with surrogate recoveries less than the lower control limit are qualified as having an estimated detection limit and flagged "UJ". Non-detected compounds with surrogate recoveries above the upper control limit require no qualification.

All surrogate results were acceptable.

#### • Precision

##### Matrix Spike/Matrix Spike Duplicate Samples

Matrix spike/matrix spike duplicate results provide matrix-specific information on the precision of the method for specific target compound classes. Precision is expressed as the relative percent difference (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample. For soil samples, results must be within RPD limits of plus/minus 30%. If RPD values are out of specification and the sample concentration is less than five times the spike concentration, all associated detected sample results are qualified as estimates and flagged "J". If RPD values are out of specification and the sample concentration is greater than five times the spike concentration, no qualification is required.

Due to an RPD outside QC limits (33%), all aroclor results (except aroclor-1260) were qualified as estimates and flagged "J".

##### Field Duplicate Samples

No field duplicates were submitted for analysis.

#### • Analytical Detection Levels

Reported analytical detection levels are compared against the 100 Area RQLs to ensure that laboratory detection levels meet the required criteria. All analytes exceeded the RQL. Under the WCH statement of work, no qualification is required.

#### • Completeness

Data Package No. K0197A was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

000003

## MAJOR DEFICIENCIES

None found.

## MINOR DEFICIENCIES

Due to a matrix spike duplicate recovery outside QC limits (54%), all aroclor results (except aroclor-1260) were qualified as estimates and flagged "J". Due to an RPD outside QC limits (33%), all aroclor results (except aroclor-1260) were qualified as estimates and flagged "J". Data flagged "J" indicates that the associated concentration is an estimate, but under the BHI statement of work, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

## REFERENCES

WCH, Contract #20266, *Validation Statement of Work*, Washington Closure Hanford Incorporated, July 7, 2003.

DOE/RL-96-22, Rev. 4, *100 Area Remedial Action Sampling and Analysis Plan*, U.S. Department of Energy, February 2005.

000004

## **Appendix 1**

### **Glossary of Data Reporting Qualifiers**

000005

Qualifiers which may be applied by data validators in compliance with the procedures herein are as follows:

- U - Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.
- UU - Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- J - Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- R - Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.
- UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.
- NJ - Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).
- N - Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

000006

## **Appendix 2**

### **Summary of Data Qualification**

000007

# PCB DATA QUALIFICATION SUMMARY\*

SDG: K0197A	REVIEWER: TU	Project: 100-B-20	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
All PCBs except aroclor-1260	J	All	MS recovery and RPD

\* - The Qualified Data Summary Table includes laboratory applied "U" qualifiers not specifically identified here. The laboratory applied "U" qualifiers are included to minimize misinterpretation of results contained in the table.

000008

### **Appendix 3**

#### **Qualified Data Summary and Annotated Laboratory Reports**

**000009**

<b>Project: WASHINGTON CLOSURE HANFORD</b>					
<b>Laboratory: LLI</b>		<b>SDG: K0197A</b>			
<b>Sample Number</b>		J10V70			
<b>Remarks</b>					
<b>Sample Date</b>		1/18/06			
<b>Extraction Date</b>		1/24/06			
<b>Analysis Date</b>		1/25/06			
<b>PCB</b>	<b>RQL</b>	<b>Result</b>	<b>Q</b>	<b>Result</b>	<b>Q</b>
Aroclor-1016	100	530	UJ		
Aroclor-1221	100	530	UJ		
Aroclor-1232	100	530	UJ		
Aroclor-1242	100	530	UJ		
Aroclor-1248	100	530	UJ		
Aroclor-1254	100	3400	J		
Aroclor-1260	100	530	U		

000010

Lionville Laboratory, Inc.

PCBs by GC

Report Date: 01/31/06 12:36

RFW Batch Number: 0601L127

Client: TNU-HANFORD RC-020

Work Order: 11343606001 Page: 1

	Cust ID:	J10V68	J10V68	J10V68	PBLKAL	PBLKAL BS
Sample	RFW#:	001	001 MS	001 MSD	06LE0061-MB1	06LE0061-MB1
Information	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL
	D.F.:	1.00	1.00	1.00	1.00	1.00
	Units:	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
Surrogate:	Tetrachloro-m-xylene	58 %	71 %	65 %	77 %	83 %
	Decachlorobiphenyl	60 %	75 %	68 %	79 %	79 %
		-----fl-----	-----fl-----	-----fl-----	-----fl-----	-----fl-----
Aroclor-1016		530 U	75 %	54 * %	400 U	69 %
Aroclor-1221		530 U	530 U	530 U	400 U	400 U
Aroclor-1232		530 U	530 U	530 U	400 U	400 U
Aroclor-1242		530 U	530 U	530 U	400 U	400 U
Aroclor-1248		530 U	530 U	530 U	400 U	400 U
Aroclor-1254		3400	530 U	530 U	400 U	400 U
Aroclor-1260		530 U	78 %	71 %	400 U	77 %

000011

✓  
3/14/06

11/31/06

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not reported. NS= Not spiked.  
%= Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. \*= Outside of EPA CLP QC

000000005

## **Appendix 4**

### **Laboratory Narrative and Chain-of-Custody Documentation**

**000012**



## Case Narrative

Client: TNU-HANFORD RC-020

LVL #: 0601L127

SDG/SAF # ~~K0197~~ RC-020

W.O. #: 11343-606-001-9999-00

Date Received: 01-20-2006

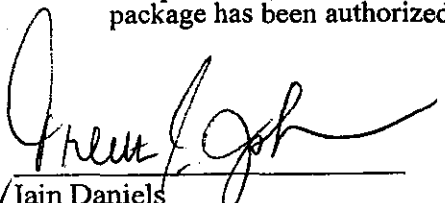
### PCB

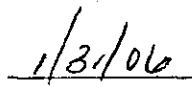
One (1) soil sample was collected on 01-18-2006.

The sample and its associated QC samples were extracted on 01-24-2006 and analyzed according to Lionville Laboratory SOPs based on SW846, 3rd Edition procedures on 01-25-2006. The extraction procedure was based on method 3540C and the extracts were analyzed based on method 8082.

The following is a summary of the QC results accompanying the sample results and a description of any problems encountered during their analyses:

1. All results presented in this report are derived from a sample that met LVL's sample acceptance policy.
2. The samples were extracted and analyzed within required holding time.
3. The samples and their associated QC samples received Copper-Sulfur, Sulfuric Acid, and Silica Gel cleanups according to Lionville Laboratory SOPs based on SW846 methods 3660A, 3665A, and 3630C respectively.
4. The method blank was below the reporting limits for all target compounds.
5. All obtainable surrogate recoveries were within acceptance criteria.
6. The blank spike recoveries were within acceptance criteria.
7. One (1) of four (4) matrix spike recoveries was outside acceptance criteria. A copy of the Sample Discrepancy Report has been enclosed.
8. The initial calibrations associated with this data set were within acceptance criteria.
9. The continuing calibration standards analyzed prior to sample extracts were within acceptance criteria with the exception of CCV analyzed on 1-25-2006 at 2:07:37pm on the RTX-CLP2 column. A copy of the Sample Discrepancy Report has been enclosed.
10. Copies of the following SDR's are associated with this narrative: 06GC027
11. LVL is NELAP accredited by the state of Pennsylvania and holds over 20 additional state accreditations. For a complete listing of accrediting authorities and the corresponding analytes/methods, please contact your Project Manager.
12. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the laboratory Manager or a designee, as verified by the following signature.

  
Iain Daniels  
Laboratory Manager  
Lionville Laboratory Incorporated

  
Date

000013

rtf:\group\data\pest\tnu hanford\0601-127.pcb

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 8 pages.

Initiator: DR  
 Date: 1/30/06  
 Client: ZOL

Batch: 0601127  
 Samples: \_\_\_\_\_  
 Method: SW846/MCAWW/CLP/

Parameter: PCB  
 Matrix: SOIL  
 Prep Batch: 0601127

1. Reason for SDR

a. COC Discrepancy ☐ Tech Profile Error ☐ Client Request ☐ Sampler Error on C-O-C  
☐ Transcription Error ☐ Wrong Test Code ☐ Other \_\_\_\_\_

b. General Discrepancy

☐ Missing Sample/Extract ☐ Container Broken ☐ Wrong Sample Pulled ☐ Label ID's Illegible  
☐ Hold Time Exceeded ☐ Insufficient Sample ☐ Preservation Wrong ☐ Received Past Hold  
☐ Improper Bottle Type ☐ Not Amenable to Analysis

Note: Verified by [Log-In] or [Prep Group] (circle)...signature/date: \_\_\_\_\_

c. Problem (Include all relevant specific results; attach data if necessary) CCV device to sample analysis  
out due to increase in instrument response on RTX CLP 2 column.  
USED FOR CONFIRMATION OF AR 1254. Result quantitated from RTX CLP  
column which not criteria. would like to narrate.  
② Slightly low AR 1016 recovery. IN MSD .54% (lower limit 60) - MS and BS recoveries  
Acceptable - narrate.

2. Known or Probable Causes(s)

3. Discussion and Proposed Action

Other Description: \_\_\_\_\_

☐ Re-log  
☐ Entire Batch  
☐ Following Samples: \_\_\_\_\_  
☐ Re-leach  
☐ Re-extract  
☐ Re-digest  
☐ Revise EDD  
☐ Change Test Code to \_\_\_\_\_  
☐ Place On/Take Off Hold (circle)

Narrate

4. Project Manager Instructions...signature/date: \_\_\_\_\_

☒ Concur with Proposed Action  
☐ Disagree with Proposed Action; See Instruction  
☐ Include in Case Narrative  
☐ Client Contacted:  
 Date/Person \_\_\_\_\_  
☐ Add  
☐ Cancel

5. Final Action...signature/date: \_\_\_\_\_

Other Explanation: \_\_\_\_\_

☐ Verified re-[log][leach][extract][digest][analysis] (circle)  
☒ Included in Case Narrative  
☐ Hard Copy COC Revised  
☐ Electronic COC Revised  
☐ EDD Corrections Completed

When Final Action has been recorded, forward original to QA Specialist for distribution and filing.

Route Distribution of Completed SDR  
☒ Initiator  
☒ Lab General Manager: M. Taylor  
☒ Project Mgr. Stone/Johnson  
☐ Data Management: Striwell  
☐ Sample Prep: Beegle/Kiger

Route Distribution of Completed SDR  
☐ Metals: Beegle  
☐ Inorganic: Perrone  
☒ GC/LC: Kiger  
☐ MS: Rychlak/Daley  
☐ Log-in: Perry  
☐ Admin: \_\_\_\_\_  
☐ Other: \_\_\_\_\_

Washington Closure Hanford		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST						RC-020-004		Page 1 of 21	
Collector Doug Bowers/C. Martinez		Company Contact Doug Bowers		Telephone No. 509-531-0701		Project Coordinator KESSNER, JH		Price Code		Data Turnaround	
Project Designation 100-BC Burial Grounds - Soil Full Protocol		Sample Location 100-B-20 (1716-B Maint Garage UST)		SAF No. RC-020		Air Quality		14 day		0000000000	
Ice Chest No. AFS-04-049		Field Logbook No. EFL-1173-7		COA C110X4 A000		Method of Shipment Fed ex		Bill of Lading/Air Bill No.		See OSPC	
Shipped To EBERLINE SERVICES LIONVILLE		Offsite Property No. A06022Y		Shipping C110X4 6700							
POSSIBLE SAMPLE HAZARDS/REMARKS none L DOT Limits		Preservation		None	Cool 4C	Cool 4C	Cool 4C	4C Cool	none	none	01/18/06
Special Handling and/or Storage Cool 4 degrees centigrade		Type of Container		G/P	aG	aG	G	aG	G	G	01/18/06
		No. of Container(s)		1	1	1	1	1	1	1	
		Volume		250g-1L	250mL-1L	230mL-1L	250mL-1L	250mL-1L	250mL-1L	250mL-1L	1L
SAMPLE ANALYSIS		See item (1) in Special Instructions.		PCBs - 3082	Semi-VOA - 8270A (TCL)	TPH (Total) - 418.1	VOA - 8260A (TCL)	Ignitability - 1010	See Item (2)		01/18/06
Sample No.	Matrix *	Sample Date	Sample Time								
J10V68	SOIL	01/18/06	1400	✓	✓	✓	✓	✓	✓	✓	
J10V69	SOIL	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
J10V70	SOIL										
J10V71	SOIL										
J10V72	SOIL										
CHAIN OF POSSESSION				Sign/Print Names				SPECIAL INSTRUCTIONS			
Relinquished By/Removed From Doug Bowers		Date/Time 1-18-06/1745		Received By/Stored In Acf 20		Date/Time 1-18-06/1745		(1) ICP Metals - 6010 (Client List) (Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium, Silicon, Silver, Sodium, Vanadium, Zinc); Mercury - 7470 - (CV)  (2) metals by ICP (TCLP) - 1311/6010 (arsenic, barium, cadmium, chromium, copper, lead, selenium, silver); mercury (TCLP) 1311/7470  01/18/06			
Relinquished By/Removed From R2 Stepper		Date/Time 1-18-06/1125		Received By/Stored In R2 Stepper		Date/Time 1-18-06/1125					
Relinquished By/Removed From R2 Stepper		Date/Time 1-18-06/1500		Received By/Stored In Fed Ex		Date/Time 1-18-06/1500					
Relinquished By/Removed From R2 Stepper		Date/Time 1-20-06/0940		Received By/Stored In R2 Stepper		Date/Time 1-20-06/0940					
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time					
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time					
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time					
LABORATORY SECTION		Received By		Title		Date/Time					
FINAL SAMPLE DISPOSITION		Disposal Method		Disposed By		Date/Time					

## **Appendix 5**

### **Data Validation Supporting Documentation**

**000016**

## PCB DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	<b>C</b>	D	E
PROJECT:	100-13-20		DATA PACKAGE: K0197A		
VALIDATOR:	TCL	LAB: LLI	DATE: 3/8/06		
			SDG: K0197A		
ANALYSES PERFORMED					
SW-846 8081	SW-846 8081 (TCLP)	<b>SW-846 8082</b>	SW-846 8081 (TCLP)		
SAMPLES/MATRIX					
J10V68					
50.1					

## 1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Technical verification documentation present? ..... Yes **No** N/A

Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

## 2. INSTRUMENT PERFORMANCE AND CALIBRATIONS (Levels D and E)

Initial calibrations acceptable? ..... Yes No **N/A**

Continuing calibrations acceptable? ..... Yes No **N/A**

Standards traceable? ..... Yes No **N/A**

Standards expired? ..... Yes No **N/A**

Calculation check acceptable? ..... Yes No **N/A**

DDT and endrin breakdowns acceptable? ..... Yes No **N/A**

Comments: \_\_\_\_\_

\_\_\_\_\_

000017

## PCB DATA VALIDATION CHECKLIST

## 3. BLANKS (Levels B, C, D, and E)

Calibration blanks analyzed? (Levels D, E) ..... Yes No N/A  
 Calibration blank results acceptable? (Levels D, E) ..... Yes No N/A  
 Laboratory blanks analyzed? ..... Yes No N/A  
 Laboratory blank results acceptable? ..... Yes No N/A  
 Field/trip blanks analyzed? (Levels C, D, E) ..... Yes No N/A  
 Field/trip blank results acceptable? (Levels C, D, E) ..... Yes No N/A  
 Transcription/calculation errors? (Levels D, E) ..... Yes No N/A  
 Comments: NO FB

## 4. ACCURACY (Levels C, D, and E)

Surrogates analyzed? ..... Yes No N/A  
 Surrogate recoveries acceptable? ..... Yes No N/A  
 Surrogates traceable? (Levels D, E) ..... Yes No N/A  
 Surrogates expired? (Levels D, E) ..... Yes No N/A  
 MS/MSD samples analyzed? ..... Yes No N/A  
 MS/MSD results acceptable? ..... Yes No N/A  
 MS/MSD standards NIST traceable? (Levels D, E) ..... Yes No N/A  
 MS/MSD standards expired? (Levels D, E) ..... Yes No N/A  
 LCS/BSS samples analyzed? ..... Yes No N/A  
 LCS/BSS results acceptable? ..... Yes No N/A  
 Standards traceable? (Levels D, E) ..... Yes No N/A  
 Standards expired? (Levels D, E) ..... Yes No N/A  
 Transcription/calculation errors? (Levels D, E) ..... Yes No N/A  
 Performance audit sample(s) analyzed? ..... Yes No N/A  
 Performance audit sample results acceptable? ..... Yes No N/A  
 Comments: MS - 5476 (1016) - J all but 1260

000018

## PCB DATA VALIDATION CHECKLIST

## 5. PRECISION (Levels C, D, and E)

Duplicate RPD values acceptable? ..... Yes ☒ No ☐ N/A ☐

Duplicate results acceptable? ..... Yes ☒ No ☐ N/A ☐

MS/MSD standards NIST traceable? (Levels D, E)..... Yes ☐ No ☒ N/A ☐

MS/MSD standards expired? (Levels D, E)..... Yes ☐ No ☒ N/A ☐

Field duplicate RPD values acceptable?..... Yes ☐ No ☒ N/A ☐

Field split RPD values acceptable? ..... Yes ☐ No ☒ N/A ☐

Transcription/calculation errors? (Levels D, E) ..... Yes ☐ No ☒ N/A ☐

Comments: 1016 RPD 339. Salt hnd 1260

## 6. SYSTEM PERFORMANCE (Levels D and E)

Chromatographic performance acceptable? ..... Yes ☐ No ☒ N/A ☐

Positive results resolved acceptably? ..... Yes ☐ No ☒ N/A ☐

Comments: \_\_\_\_\_

## 7. HOLDING TIMES (all levels)

Samples properly preserved?..... ☒ Yes ☐ No ☐ N/A

Sample holding times acceptable? ..... ☒ Yes ☐ No ☐ N/A

Comments: \_\_\_\_\_

000019

## PCB DATA VALIDATION CHECKLIST

## 8. COMPOUND IDENTIFICATION, QUANTITATION, AND DETECTION LIMITS (all levels)

Compound identification acceptable? (Levels D, E)..... Yes No N/A

Compound quantitation acceptable? (Levels D, E)..... Yes No N/A

Results reported for all requested analyses?..... Yes No N/A

Results supported in the raw data? (Levels D, E)..... Yes No N/A

Samples properly prepared? (Levels D, E)..... Yes No N/A

Detection limits meet RDL?..... Yes No N/A

Transcription/calculation errors? (Levels D, E)..... Yes No N/A

Comments: all undetected

## 9. SAMPLE CLEANUP (Levels D and E)

Fluorilicil ® (or other absorbent) cleanup performed?..... Yes No N/A

Lot check performed?..... Yes No N/A

Check recoveries acceptable?..... Yes No N/A

GPC cleanup performed?..... Yes No N/A

GPC check performed?..... Yes No N/A

GPC check recoveries acceptable?..... Yes No N/A

GPC calibration performed?..... Yes No N/A

GPC calibration check performed?..... Yes No N/A

GPC calibration check retention times acceptable?..... Yes No N/A

Check/calibration materials traceable?..... Yes No N/A

Check/calibration materials Expired?..... Yes No N/A

Analytical batch QC given similar cleanup?..... Yes No N/A

Transcription/Calculation Errors?..... Yes No N/A

Comments:

Date: 16 March 2006  
To: Washington Closure Hanford Inc. (technical representative)  
From: TechLaw, Inc.  
Project: 100-BC Burial Grounds – Soil Full Protocol - Waste Site 100-B-20  
Subject: Volatile - Data Package No. K0197A-LLI

## **INTRODUCTION**

This memo presents the results of data validation on Data Package No. K0197A prepared by Lionville Laboratory Inc. (LLI). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Method
J10V68	1/18/06	Soil	C	VOAs by 8260B
J10V68DL	1/18/06	Soil	C	VOAs by 8260B

Data validation was conducted in accordance with the Washington Closure Hanford (WCH) validation statement of work and the 100 Area Remedial Action Sampling and Analysis Plan (DOE/RL-96-22, February 2005). Appendices 1 through 5 provide the following information as indicated below:

- Appendix 1. Glossary of Data Reporting Qualifiers
- Appendix 2. Summary of Data Qualification
- Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
- Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
- Appendix 5. Data Validation Supporting Documentation

## **DATA QUALITY OBJECTIVES**

### **• Holding Times**

Analytical holding times were assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Samples must be analyzed within 14 days of the date of sample collection.

If holding times are exceeded, but not by greater than two times the limit, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If holding times are exceeded by greater than two times the limit, all associated detectable sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR".

All holding times were met.

000001

## • Method Blanks

Method blank analyses are conducted to determine the extent of laboratory contamination introduced through sampling, sample preparation and analysis. At least one acceptable method blank analysis must be conducted for every 20 samples. No contaminants should be present in the method blank. Analytical results for analytes present in any sample at less than five times the concentration of that analyte found in the associated blank are qualified as non-detects and flagged "U". Common laboratory contaminants present in samples at less than ten times the concentration of that analyte found in the associated blank are qualified as non-detects. If a sample result is less than the CRQL and is less than five times (or less than ten times for lab contaminants) the highest associated blank result, the sample result value is raised to the CRQL level and qualified as undetected "U".

All method blank results were acceptable.

## Field Blanks

No field blanks were submitted for analysis.

## • Accuracy

### Matrix Spike/Matrix Spike Duplicate & Blank Spike Recoveries

Matrix spike/matrix spike duplicate analyses are used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike/matrix spike duplicate analyses are performed in duplicate using five compounds for which percent recoveries must be within a range of 50-150% or within laboratory control limits. If spike recoveries are outside control limits, detected sample results less than five times the spike concentration are qualified as estimates and flagged "J". Undetected sample results with spike recoveries below control limits are qualified as estimates and flagged "UJ". Undetected sample results are not qualified if the spike recovery is above control limits. Sample results greater than five times the spike concentration require no qualification.

Due to the lack of a matrix spike or matrix spike duplicate analysis, all volatile organic results in sample J10V68 were qualified as estimates and flagged "J".

All other accuracy results were acceptable.

000002

### Surrogate Recovery

The analyses of surrogate compounds provide a measure of performance for individual samples. Matrix-specific surrogate compound recovery control windows have been established by the EPA CLP program. If two surrogates of the same class of compounds (base/neutral or acid) are out of control limits, all associated sample results greater than the contract required quantitation limit (CRQL) are qualified as estimates and flagged "J". Sample results less than the CRQL and below the lower control limit are qualified as estimates and flagged "UJ". Sample results less than the CRQL with recoveries above the upper control limit require no qualification. If a surrogate recovery is less than 10%, detects are qualified as estimates and flagged "J" and nondetects are rejected and flagged "UR".

All surrogate results were acceptable.

### Precision

#### Matrix Spike/Matrix Spike Duplicate Samples

Matrix spike (MS)/matrix spike duplicate (MSD) results provide matrix-specific information on the precision of the method for specific target compound classes. Precision is expressed by the relative percent difference (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample. Samples results must be within RPD limits of  $\pm 30\%$ . If RPD values are out of specification and the sample concentration is less than five times the spike concentration, all associated detected sample results are qualified as estimates and flagged "J". If RPD values are out of specification and the sample concentration is greater than five times the spike concentration, no qualification is required.

Due to the lack of a matrix spike or matrix spike duplicate analysis, all volatile organic results in sample J10V68 were qualified as estimates and flagged "J".

All other precision results were acceptable.

#### Field Duplicate Samples

No field duplicates were submitted for analysis.

000003

## **Analytical Detection Levels**

Reported analytical detection levels are compared against the required quantitation limits (RQL's) to ensure that laboratory detection levels meet the required criteria. All undetected analytes exceeded the RQL. Under the WCH statement of work, no qualification is required.

## **Completeness**

Data package No. K0197A was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

## **MAJOR DEFICIENCIES**

None found.

## **MINOR DEFICIENCIES**

Due to the lack of a matrix spike or matrix spike duplicate analysis, all volatile organic results in sample J10V68 were qualified as estimates and flagged "J". Data flagged "J" indicates that the associated concentration is an estimate, but under the BHI statement of work, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

All undetected analytes exceeded the RQL. Under the WCH statement of work, no qualification is required

## **REFERENCES**

BHI, MRB-SBB-A23665, *Validation Statement of Work*, Bechtel Hanford Incorporated, September 5, 1997.

DOE/RL-96-22, Rev. 4, *100 Area Remedial Action Sampling and Analysis Plan*, U.S. Department of Energy, February 2005.

000004

**Appendix 1**  
**Glossary of Data Reporting Qualifiers**

000005

Qualifiers which may be applied by data validators in compliance with the BHI validation SOW are as follows:

- U - Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the same quantitation limit corrected for sample dilution and moisture content by the laboratory.
- UJ - Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- J - Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- R - Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.
- UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.
- NJ - Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).
- N - Indicates presumptive evidence of a compound. The data may not be valid for some specific applications usable for decision-making purposes).

000006

**Appendix 2**  
**Summary of Data Qualification**

**000007**

## VOLATILE DATA QUALIFICATION SUMMARY\*

SDG: K0197A	REVIEWER: TLJ	Project: 100-B-20	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
All	J	J10V68	No MS/MSD

\* - The Qualified Data Summary Table includes laboratory applied "U" qualifiers not specifically identified here. The laboratory applied "U" qualifiers are included to minimize misinterpretation of results contained in the table.

000008

### **Appendix 3**

#### **Qualified Data Summary and Annotated Laboratory Reports**

**000009**

Project: WASHINGTON CLOSURE HANFORD											
Laboratory: LLI											
Case:		SDG: K0197									
Sample Number		J10V68		J10V68DL							
Remarks											
Sample Date		1/18/06		1/18/06							
Analysis Date		1/30/06		1/30/06							
VOA	RQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Chloromethane	10	60	UJ	1700	U						
Bromomethane	10	60	UJ	1700	U						
Vinyl Chloride	10	60	UJ	1700	U						
Chloroethane	10	60	UJ	1700	U						
Methylene Chloride	10	180	J	840	U						
Acetone	10	9500	J	1400							
Carbon Disulfide	10	9	J	840	U						
1,1-Dichloroethene	10	30	UJ	840	U						
1,1-Dichloroethane	10	30	UJ	840	U						
1,2-Dichloroethene (total)	10	6	J	840	U						
Chloroform	10	30	UJ	840	U						
1,2-Dichloroethane	10	21	J	840	U						
2-Butanone	10	1900	J	820							
1,1,1-Trichloroethane	10	30	UJ	840	U						
Carbon Tetrachloride	10	30	UJ	840	U						
Bromodichloromethane	10	30	UJ	840	U						
1,2-Dichloropropane	10	30	UJ	840	U						
cis-1,3-Dichloropropene	10	30	UJ	840	U						
Trichloroethene	10	9	J	840	U						
Dibromochloromethane	10	30	UJ	840	U						
1,1,2-Trichloroethane	10	30	UJ	840	U						
Benzene	10	400	J	610							
trans-1,3-Dichloropropene	10	30	UJ	840	U						
Bromoform	10	30	UJ	840	U						
4-Methyl-2-pentanone	10	2200	J	1400							
2-Hexanone	10	60	J	1700							
Tetrachloroethene	10	79	J	450							
1,1,2,2-Tetrachloroethane	10	30	UJ	840	U						
Toluene	10	1800	J	5100							
Chlorobenzene	10	6	J	840	U						
Ethylbenzene	10	530	J	2900							
Styrene	10	30	UJ	840	U						
Xylene	10	3200	J	18000							
M&P Xylene	10	2200	J	12000							
O-Xylene	10	1100	J	5600							
cis-1,2-Dichloroethene	10	6	J	840	U						
trans-1,2-Dichloroethene	10	30	UJ	840	U						

Laboratory applied non-detect qualifiers "U" have been included in this table to minimize mis-interpretation of results. All other qualifiers shown were applied during validation.

000010

RFW Batch Number: 0601L127

Client: TNUHANFORD RC-020 K0197 Work Order: 11343606001 Page: 1a

Cust ID:		J10V68	J10V68	J10V68	J10V68	VBLKPL	VBLKPL BS						
Sample	RFW#:	001	001 DL	001 MS	001 MSD	06LVX018-MB1	06LVX018-MB1						
Information	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL						
	D.P.:	4.55	2.05	2.05	2.05	1.00	1.00						
	Units:	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG						
	Level:	LOW	MED	MED	MED	LOW	LOW						
Toluene-d8		98	%	98	%	110	%	106	%	92	%	89	%
Surrogate Bromofluorobenzene		99	%	104	%	108	%	108	%	91	%	88	%
Recovery 1,2-Dichloroethane-d4		112	%	98	%	112	%	111	%	92	%	87	%
=====fl=====fl=====fl=====fl=====fl=====fl=====fl=====													
Chloromethane		60	U	1700	U	77	%	82	%	10	U	71	%
Bromomethane		60	U	1700	U	75	%	74	%	10	U	74	%
Vinyl Chloride		60	U	1700	U	83	%	77	%	10	U	72	%
Chloroethane		60	U	1700	U	83	%	81	%	10	U	88	%
Methylene Chloride		180	B	840	U	92	%	91	%	3	J	83	%
Acetone		9500	E	1400	JD	94	%	89	%	10	U	57	%
Carbon Disulfide		9	<del>U</del>	840	U	88	%	84	%	5	U	90	%
1,1-Dichloroethene		30	U	840	U	87	%	84	%	5	U	89	%
1,1-Dichloroethane		30	U	840	U	96	%	89	%	5	U	93	%
1,2-Dichloroethene (total)		6	<del>U</del>	840	U	90	%	87	%	5	U	89	%
Chloroform		30	U	840	U	99	%	95	%	5	U	97	%
1,2-Dichloroethane		21	<del>U</del>	840	U	100	%	98	%	5	U	89	%
2-Butanone		1900	E	820	JD	96	%	102	%	10	U	65	%
1,1,1-Trichloroethane		30	U	840	U	93	%	86	%	5	U	99	%
Carbon Tetrachloride		30	U	840	U	99	%	91	%	5	U	102	%
Bromodichloromethane		30	U	840	U	100	%	95	%	5	U	93	%
1,2-Dichloropropane		30	U	840	U	99	%	94	%	5	U	87	%
cis-1,3-Dichloropropene		30	U	840	U	102	%	100	%	5	U	86	%
Trichloroethene		9	<del>U</del>	840	U	100	%	95	%	5	U	92	%
Dibromochloromethane		30	U	840	U	102	%	99	%	5	U	91	%
1,1,2-Trichloroethane		30	U	840	U	98	%	95	%	5	U	84	%
Benzene		400		610	JD	98	%	93	%	5	U	88	%
Trans-1,3-Dichloropropene		30	U	840	U	104	%	100	%	5	U	84	%
Bromoform		30	U	840	U	95	%	97	%	5	U	80	%
4-Methyl-2-pentanone		2200	E	1400	JD	104	%	113	%	10	U	66	%
2-Hexanone		60	U	1700	U	101	%	111	%	10	U	61	%
Tetrachloroethene		79		450	JD	101	%	95	%	5	U	97	%
1,1,2,2-Tetrachloroethane		30	U	840	U	99	%	99	%	5	U	77	%
Toluene		1800	E	5100	D	100	%	94	%	5	U	91	%

\* = Outside of EPA CLP QC limits.

K 3/10/06

000000006

Cust ID: J10V68 J10V68 J10V68 J10V68 VBLKPL VBLKPL BS

RFW#: 001 001 DL 001 MS 001 MSD 06LVX018-MB1 06LVX018-MB1  
 Level: LOW MED MED MED LOW LOW

Chlorobenzene	6	840	U	101	%	96	%	5	U	90	%
Ethylbenzene	530	2900	D	99	%	96	%	5	U	92	%
Styrene	30 U	840	U	123	%	121	%	5	U	81	%
Xylene (total)	3200	18000	D	96	%	92	%	5	U	91	%
M&P Xylene	2200	12000	D	96	%	92	%	5	U	91	%
O-Xylene	1100	5600	D	96	%	92	%	5	U	92	%
cis-1,2-Dichloroethene	6	840	U	94	%	89	%	5	U	87	%
trans-1,2-Dichloroethene	30 U	840	U	85	%	84	%	5	U	91	%

\*= Outside of EPA CLP QC limits.

*12*  
*3/10/02*

0000012

000000007

RFW Batch Number: 0601L127

Client: TNUHANFORD RC-020 K0197 Work Order: 11343606001 Page: 2a

Cust ID: VBLKPK

**VBLKPK BS**

## Sample Information

RFW#: 06LVX020-MB1 06LVX020-MB1

Matrix: SOIL SOIL

D.F.:	2.00	2.00
-------	------	------

Units: UG/KG UG/KG

Level: MED MED

	Toluene-d8	94	%	90	%
Surrogate	Bromofluorobenzene	87	%	93	%
Recovery	1,2-Dichloroethane-d4	83	%	88	%

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=====fl=====fl=====fl=====fl=====fl=====fl
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Chloromethane	1200	U	91	%
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Bromomethane	1200	U	83	%
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Vinyl Chloride	1200	U	82	%
----------------	------	---	----	---

Chloroethane	1200	II	95	8
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Chloroacetaldehyde	1200	S	99	%
Methylene Chloride	160	J	91	%

Methylene chloride	100	S	91	%
Acetone	1200	II	84	%

Acetone	1200	G	94	%
Carbon Disulfide	620	H	98	%

Carbon Disulfide	620	U	98	4
1,1-Dichloroethane	630	H	93	8

1,1-Dichloroethene	620	U	92	2
1,1-Dichloroethane	620	U	92	2

1,1-Dichloroethane	620	0	98	%
1,1,1-Trichloroethane	550	0	98	%

1,2-Dichloroethene (total)	620	U	96	%
----------------------------	-----	---	----	---

Chloroform	620	U	103	%
------------	-----	---	-----	---

1,2-Dichloroethane	620	U	97	%
--------------------	-----	---	----	---

2-Butanone	1200	U	100	%
------------	------	---	-----	---

1,1,1-Trichloroethane	620	U	103	%
-----------------------	-----	---	-----	---

Carbon Tetrachloride	620	U	106	%
----------------------	-----	---	-----	---

Bromodichloromethane	620	U	103	%
----------------------	-----	---	-----	---

1,2-Dichloropropane	620	U	99	%
---------------------	-----	---	----	---

cis-1,3-Dichloropropene	620	U	100	%
-------------------------	-----	---	-----	---

Trichloroethene	620	II	103	%
-----------------	-----	----	-----	---

Dibromochloromethane	620	II	103	%
----------------------	-----	----	-----	---

1,1,1-Trichloroethane	620	U	102	%
1,1,2-Trichloroethane	630	U	88	%

1,1,2-trichloroethane	620	U	99	6
Benzene	620	U	99	6

Benzene	620	U	99	8
Formaldehyde	620	U	100	8

Trans-1,3-Dichloropropene	620	0	100	%
---------------------------	-----	---	-----	---

Bromoform	620	U	101	%
-----------	-----	---	-----	---

4-Methyl-2-pentanone	1200	U	99	%
----------------------	------	---	----	---

2 - Hexanone	1200	U	104	%
--------------	------	---	-----	---

Tetrachloroethene	620	U	104	%
-------------------	-----	---	-----	---

1,1,2,2-Tetrachloroethane	620	U	105	%
---------------------------	-----	---	-----	---

Toluene	620	U	100	%
---------	-----	---	-----	---

\*= Outside of EPA CLP QC limits.

000013

3/10/01

Cust ID: VBLKPK

VBLKPK BS

RFW#: 06LVX020-MB1 06LVX020-MB1

Level:

MED

MED

Chlorobenzene	620	U	99	%
Ethylbenzene	620	U	100	%
Styrene	620	U	108	%
Xylene (total)	620	U	100	%
M&P Xylene	620	U	100	%
O-Xylene	620	U	101	%
cis-1,2-Dichloroethene	620	U	96	%
trans-1,2-Dichloroethene	620	U	95	%

\*= Outside of EPA CLP QC limits.

*12*  
*3/10/06*

0000017

000000009

## **Appendix 4**

### **Laboratory Narrative and Chain-of-Custody Documentation**

**000015**



## Case Narrative

Client: TNU-HANFORD RC-020  
LVL #: 0601L127  
SDG/SAF # K0197/RC-020

W.O. #: 11343-606-001-9999-00  
Date Received: 01-20-2006

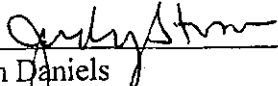
### GC/MS VOLATILE

One (1) soil sample was collected on 01-18-2006.

The sample and its associated QC samples were analyzed according to criteria set forth in Lionville Laboratory SOPs based on SW 846 Method 8260B for TCL volatile target compounds on 01-26,30-2006.

The following is a summary of the QC results accompanying these sample results and a description of any problems encountered during their analyses:

1. All results presented in this report are derived from a sample that met LvLI's sample acceptance policy.
2. The sample was analyzed within required holding time.
3. Non-target compounds were detected in the sample.
4. The sample required a medium level analysis due to high levels of both target and non-target compounds. Due to programming limitations, the dilution factor for the medium level analysis does not reflect the true dilution; however, the results are correct.
5. All surrogate recoveries were within acceptance criteria.
6. All matrix spike recoveries were within acceptance criteria.
7. All blank spike recoveries were within acceptance criteria.
8. The method blanks contained the common laboratory contaminant Methylene Chloride at levels less than the CRQL.
9. Internal standard area and retention time criteria were met.
10. Manual integrations are performed according to SOP QA-125 to produce quality data with the utmost integrity. All manual integrations are required to be technically valid and properly documented. Appropriate technical flags are defined in the Glossary ("Technical Flags For Manual Integration").
11. LvLI is NELAP accredited by the state of Pennsylvania and holds over 20 additional state accreditations. For a complete listing of accrediting authorities and the corresponding analytes/methods, please contact your Project Manager.
12. "I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature."

  
Iain Daniels  
Laboratory Manager  
Lionville Laboratory Incorporated

2/7/06  
Date

son\group\data\voaltm-hanford\0601-127.doc

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 16 pages.

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00000002

Washington Closure Hanford		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST						RC-020-004		Page 1 of 21	
Collector Doug Bowers/C. Martinez		Company Contact Doug Bowers		Telephone No. 509-531-0701		Project Coordinator KESSNER, JH		Price Code		Data Turnaround	
Project Designation 100-BC Burial Grounds - Soil Full Protocol		Sample Location 100-B-20 (1716-B Maint Garage UST)		SAF No. RC-020		Air Quality		14 day		10000000	
Ice Chest No. AFS-04-049		Field Logbook No. EFL-1173-7		COA C110X4 A 000		Method of Shipment Fed ex					
Shipped To EBERLINE SERVICES (LIONVILLE)		Offsite Property No. A060224		Shipping C110X4 6700		Bill of Lading/Air Bill No. See USPC					
POSSIBLE SAMPLE HAZARDS/REMARKS none < DOT Limits		Preservation		None	Cool 4C	Cool 4C	Cool 4C	4C Cool	none	none	oil
Special Handling and/or Storage Cool 4 degrees centigrade		Type of Container		G/P	AG	AG	G	AG	G	G	8/06
		No. of Container(s)		1	1	1	1	1	1	1	
		Volume		250g-1L	250ml-1L	250ml-1L	250ML-1L	250ml-1L	250ml-1L	250ml-1L	1L
SAMPLE ANALYSIS		See item (1) in Special Instructions.		PCBs - 8082	Semi-VOA - 8270A (TCL)	TPH (Total) - 418.1	VOA - 8260A (TCL)	Ignitability - 1010	See Item (a)		01/18/06
Sample No.	Matrix *	Sample Date	Sample Time								
J10V68	SOIL	01/12/06	1400	✓	✓	✓	✓	✓	✓	✓	
J10V69	SOIL	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
J10V70	SOIL										
J10V71	SOIL										
J10V72	SOIL										
CHAIN OF POSSESSION				Sign/Print Names				SPECIAL INSTRUCTIONS			
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time		(1) ICP Metals - 6010 (Client List) (Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium, Silicon, Silver, Sodium, Vanadium, Zinc); Mercury - 7470 - (CV)  (2) Metals by ICP (TCLP) - 1311/6010 (arsenic, barium, cadmium, chromium, lead, selenium, silver); mercury (TCLP) 1311/7470  01/18/06			
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time					
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time					
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time					
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time					
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time		Matrix *			
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time		S=Soil SE=Soil/Sediment SL=Solid SL=Sludge W=Water U=Ull A=Air DS=Drum Solids DL=Drum Liquids T=Trash W=Wipe L=Liquid V=Vegetation X=Other			
LABORATORY SECTION		Received By		Title		Date/Time					
FINAL SAMPLE DISPOSITION		Disposal Method		Disposed By		Date/Time					

Lionville Laboratory, Inc.  
VOA ANALYTICAL DATA PACKAGE FOR  
TNUHANFORD RC-020 K0197



DATE RECEIVED: 01/20/06

LVL LOT # :06011127

CLIENT ID	LVL #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
J10V68	001	S	06LVX018	01/18/06	N/A	01/26/06
J10V68	001 M2	S	06LVX020	01/18/06	N/A	01/30/06
J10V68	001 MS M1	S	06LVX020	01/18/06	N/A	01/30/06
J10V68	001 MSD M1	S	06LVX020	01/18/06	N/A	01/30/06

LAB QC:

VBLKPL	MB1	S	06LVX018	N/A	N/A	01/26/06
VBLKPL	MB1 BS	S	06LVX018	N/A	N/A	01/26/06
VBLKPK	MB1	S	06LVX020	N/A	N/A	01/30/06
VBLKPK	MB1 BS	S	06LVX020	N/A	N/A	01/30/06

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**Appendix 5**  
**Data Validation Supporting Documentation**

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## GC/MS ORGANIC DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	<u>C</u>	D	E
PROJECT:	100-B-20		DATA PACKAGE: K0197A		
VALIDATOR:	TLI	LAB:	LLI	DATE: 3/9/06	
			SDG:	K0197A	
ANALYSES PERFORMED					
<u>SW-846 8260</u>		SW-846 8260 (TCLP)	SW-846 8270		SW-846 8270 (TCLP)
SAMPLES/MATRIX					
J10V68					
J10V68DL (- reanalysis)					
501					

## 1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Technical verification documentation present? ..... Yes No N/A

Comments: \_\_\_\_\_

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## 2. INSTRUMENT TUNING AND CALIBRATION (Levels D and E)

GC/MS tuning/performance check acceptable? ..... Yes No N/AInitial calibrations acceptable? ..... Yes No N/AContinuing calibrations acceptable? ..... Yes No N/AStandards traceable? ..... Yes No N/AStandards expired? ..... Yes No N/ACalculation check acceptable? ..... Yes No N/A

Comments: \_\_\_\_\_

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## GC/MS ORGANIC DATA VALIDATION CHECKLIST

## 3. BLANKS (Levels B, C, D, and E)

Calibration blanks analyzed? (Levels D, E) ..... Yes No N/A  
 Calibration blank results acceptable? (Levels D, E) ..... Yes No N/A  
 Laboratory blanks analyzed? ..... Yes No N/A  
 Laboratory blank results acceptable? ..... yes yes No N/A  
 Field/trip blanks analyzed? (Levels C, D, E) ..... Yes No N/A  
 Field/trip blank results acceptable? (Levels C, D, E) ..... Yes No N/A  
 Transcription/calculation errors? (Levels D, E) ..... Yes No N/A  
 Comments: no FB

MB 68 DL 3/9/09  
2/14

## 4. ACCURACY (Levels C, D, and E)

Surrogates/system monitoring compounds analyzed? ..... Yes No N/A  
 Surrogate/system monitoring compound recoveries acceptable? ..... Yes No N/A  
 Surrogates traceable? (Levels D, E) ..... Yes No N/A  
 Surrogates expired? (Levels D, E) ..... Yes No N/A  
 MS/MSD samples analyzed? ..... Yes No N/A  
 MS/MSD results acceptable? ..... Yes No N/A  
 MS/MSD standards NIST traceable? (Levels D, E) ..... Yes No N/A  
 MS/MSD standards? (Levels D, E) ..... Yes No N/A  
 LCS/BSS samples analyzed? ..... Yes No N/A  
 LCS/BSS results acceptable? ..... Yes No N/A  
 Standards traceable? (Levels D, E) ..... Yes No N/A  
 Standards expired? (Levels D, E) ..... Yes No N/A  
 Transcription/calculation errors? (Levels D, E) ..... Yes No N/A  
 Performance audit sample(s) analyzed? ..... Yes No N/A  
 Performance audit sample results acceptable? ..... Yes No N/A

Comments:

NO MS for 68 - J all  
MSD

no TAC

NO LCS for 68 DL 3/9/09

## GC/MS ORGANIC DATA VALIDATION CHECKLIST

## 5. PRECISION (Levels C, D, and E)

MS/MSD samples analyzed? ..... Yes No N/A  
MS/MSD RPD values acceptable? ..... Yes No N/A  
MS/MSD standards NIST traceable? (Levels D, E) ..... Yes No N/A  
MS/MSD standards expired? (Levels D, E) ..... Yes No N/A  
Field duplicate RPD values acceptable? ..... Yes No N/A  
Field split RPD values acceptable? ..... Yes No N/A  
Transcription/calculation errors? (Levels D, E) ..... Yes No N/A

Comments: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

## 6. SYSTEM PERFORMANCE (Levels D and E)

Internal standards analyzed? ..... Yes No N/A  
Internal standard areas acceptable? ..... Yes No N/A  
Internal standard retention times acceptable? ..... Yes No N/A  
Standards traceable? ..... Yes No N/A  
Standards expired? ..... Yes No N/A  
Transcription/calculation errors? ..... Yes No N/A

Comments: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

## 7. HOLDING TIMES (all levels )

Samples properly preserved? ..... Yes No N/A  
Sample holding times acceptable? ..... Yes No N/A

Comments: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

## GC/MS ORGANIC DATA VALIDATION CHECKLIST

## 8. COMPOUND IDENTIFICATION, QUANTITATION, AND DETECTION LIMITS (all levels)

Compound identification acceptable? (Levels D, E)..... Yes No N/A  
Compound quantitation acceptable? (Levels D, E)..... Yes No N/A  
Results reported for all requested analyses?..... Yes No N/A  
Results supported in the raw data? (Levels D, E)..... Yes No N/A  
Samples properly prepared? (Levels D, E)..... Yes No N/A  
Laboratory properly identified and coded all TIC? (Levels D, E)..... Yes No N/A  
Detection limits meet RDL?..... Yes No N/A  
Transcription/calculation errors? (Levels D, E)..... Yes No N/A  
Comments: all undetected over

## 9. SAMPLE CLEANUP (Levels D and E)

GPC cleanup performed?..... Yes No N/A  
GPC check performed?..... Yes No N/A  
GPC check recoveries acceptable?..... Yes No N/A  
GPC calibration performed?..... Yes No N/A  
GPC calibration check performed?..... Yes No N/A  
GPC calibration check retention times acceptable?..... Yes No N/A  
Check/calibration materials traceable?..... Yes No N/A  
Check/calibration materials Expired?..... Yes No N/A  
Analytical batch QC given similar cleanup?..... Yes No N/A  
Transcription/Calculation Errors?..... Yes No N/A  
Comments:\_\_\_\_\_

Date: 16 March 2006  
To: Washington Closure Hanford Inc. (technical representative)  
From: TechLaw, Inc.  
Project: 100-BC Burial Grounds – Soil Full Protocol - Waste Site 100-B-20  
Subject: Inorganics - Data Package No. K0197A-LLI

## **INTRODUCTION**

This memo presents the results of data validation on Data Package No. K0197A prepared by Lionville Laboratory Inc. (LLI). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Date
J10V68	1/18/06	Soil	C	See note 1

1 - ICP metals (6010B) and mercury (7471A) and TCLP by 1311/6010B.

Data validation was conducted in accordance with the Washington Closure Hanford (WCH) validation statement of work and the 100 Area Remedial Action Sampling and Analysis Plan (DOE/RL-96-22, February 2005). Appendices 1 through 6 provide the following information as indicated below:

- Appendix 1. Glossary of Data Reporting Qualifiers
- Appendix 2. Summary of Data Qualification
- Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
- Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
- Appendix 5. Data Validation Supporting Documentation
- Appendix 6. Additional Documentation Requested by Client

## **DATA QUALITY PARAMETERS**

### **• Holding Times**

Analytical holding times for metals are assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Soil samples must be analyzed within 28 days for mercury and 6 months for ICP metals.

All holding times were acceptable.

### **• Preparation (Method) Blanks**

#### **Preparation Blanks**

At least one preparation blank, consisting of deionized distilled water processed through each sample preparation and analysis procedure, must be prepared and

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analyzed with every sample delivery group. In the case of positive blank results, samples with digestate concentrations less than five times the preparation blank value have had their associated values qualified as non-detected and flagged "U". Samples with concentrations of greater than five times the highest blank concentration do not require qualification.

In the case of negative blank results, if the absolute value exceeds the contract required detection limit (CRDL), all nondetects are rejected and flagged "UR" and all detects that are less than ten times the absolute value of the associated preparation blank result are qualified as estimates and flagged "J". If the absolute value of the negative preparation blank is greater than the instrument detection limit (IDL) and less than or equal to the CRDL, all nondetects are qualified as estimates and flagged "UJ" and all detects less than ten times the absolute value of the blank are qualified as estimates and flagged "J". If the sample results are greater than ten times the absolute value of the preparation blank, no qualification is necessary.

All preparation blank results were acceptable.

#### Field (Equipment) Blank

No field blank was submitted for analysis.

#### **Accuracy**

#### Matrix Spike and Laboratory Control Sample

Matrix spike (MS) and laboratory control sample (LCS) analyses are used to assess the analytical accuracy of the reported data. The matrix spike is used to assess the effect of the matrix on the ability to accurately quantify sample concentrations. Recoveries must fall within the range of 70% to 130%. Samples with a recovery of less than 30% and a sample result below the IDL are rejected and flagged "UR". Samples with a recovery of 30% to 69% and a sample result less than the IDL are qualified "UJ". Samples with a recovery of greater than 130% or less than 70% and a sample result greater than the IDL are qualified as estimates and flagged "J". Finally, for samples with a recovery greater than 130% and a sample result less than the IDL, no qualification is required.

Due to a matrix spike recovery outside QC limits (64.2%), the boron result was qualified as estimates and flagged "J".

Due to a matrix spike recovery outside QC limits (302%), the silicon result was qualified as estimates and flagged "J".

Due to a matrix spike recovery outside QC limits (28.7%), the silver TCLP result was qualified as estimates and flagged "J".

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Due to an LCS recovery outside QC limits (58.4%), the silicon result in was qualified as estimates and flagged "J".

All other accuracy results were acceptable.

#### **Precision**

##### Laboratory Duplicate Samples

Analytical precision is expressed by the relative percent differences (RPD) between the recoveries of matrix spike duplicate (MSD) analyses performed on a sample in the analytical batch. Precision may alternatively be assessed using unspiked duplicate analyses performed on a sample in the analytical batch. If both sample and replicate activities (concentrations) are greater than five times the CRDL and the RPD is less than 30%, no qualification is required. If either activity (concentration) is less than five times the CRDL, the RPD control limit is less than or equal to two times the CRDL. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects or estimated non-detects.

Due to an RPD outside QC limits (34%), the chromium TCLP result was qualified as an estimate and flagged "J".

All other laboratory duplicate results were acceptable.

##### Field Duplicate

No field duplicates were submitted for analysis.

#### **Analytical Detection Levels**

Reported analytical detection levels are compared against the 100 Area RQLs to ensure that laboratory detection levels meet the required criteria. The silver, silver TCLP, selenium and selenium TCLP results exceeded the RQL. Under the WCH statement of work, no qualification is required. All other analytes met the RQL.

#### **Completeness**

Data package No. K0197A was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

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## **MAJOR DEFICIENCIES**

None found.

## **MINOR DEFICIENCIES**

The following minor deficiencies were reported:

- Due to a matrix spike recovery outside QC limits (64.2%), the boron result was qualified as estimates and flagged "J".
- Due to a matrix spike recovery outside QC limits (302%), the silicon result was qualified as estimates and flagged "J".
- Due to a matrix spike recovery outside QC limits (28.7%), the silver TCLP result was qualified as estimates and flagged "J".
- Due to an LCS recovery outside QC limits (58.4%), the silicon result in was qualified as estimates and flagged "J".
- Due to an RPD outside QC limits (34%), the chromium TCLP result was qualified as an estimate and flagged "J".

Data flagged "J" indicates that the associated concentration is an estimate, but under the BHI statement of work, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

The silver, silver TCLP, selenium and selenium TCLP results exceeded the RQL. Under the WCH statement of work, no qualification is required.

## **REFERENCES**

WCH, Contract #20266, *Validation Statement of Work*, Washington Closure Hanford Incorporated, July 7, 2003.

DOE/RL-96-22, Rev. 4, *100 Area Remedial Action Sampling and Analysis Plan*, U.S. Department of Energy, February 2005.

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**Appendix 1**  
**Glossary of Data Reporting Qualifiers**

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Qualifiers which may be applied by data validators in compliance with BHI validation SOW are as follows:

- U - Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.
- UJ - Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- J - Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated concentration is an estimate, but the data are usable for decision-making purposes.
- BJ - Applied to inorganic analyses only. Indicates the analyte concentration was greater than the IDL but less than the CRDL and is considered an estimated value.
- R - Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.
- UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.
- NJ - Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).
- N - Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

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**Appendix 2**  
**Summary of Data Qualification**

**000007**

# METALS DATA QUALIFICATION SUMMARY\*

SDG: K0107A	REVIEWER: TL	Project: 100-B-20	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Boron Silicon Silver TCLP	J	All	MS recovery
Silicon	J	All	LCS recovery
Chromium TCLP	J	All	RPD

\* - The Qualified Data Summary Table includes laboratory applied "U" qualifiers not specifically identified here. The laboratory applied "U" qualifiers are included to minimize misinterpretation of results contained in the table.

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### **Appendix 3**

#### **Qualified Data Summary and Annotated Laboratory Reports**

**000009**

Project: WASHINGTON CLOSURE HANFORD							
Lab: LLI		SDG: K0197A					
Sample Number		J10V68				J10V68	
Remarks						TCLP	
Sample Date		1/18/06				1/18/06	
Inorganics	RQL	Result	Q	Result	RQL	Result	Q
Silver	0.2	1.1	U		0.5	14.0	UJ
Aluminum		1100				NA	
Arsenic	10	6.6			0.5	42.4	
Boron		105	J			NA	
Barium	2	2350			10	412	
Beryllium		0.08	U			NA	
Calcium		19600				NA	
Cadmium	0.2	10.8			0.1	76.6	
Cobalt		1.4				NA	
Chromium	1	49.7			0.015	18.3	J
Copper		165				NA	
Iron		9300				NA	
Mercury	0.2	0.15			0.02	1.0	
Potassium		358				NA	
Magnesium		829				NA	
Manganese		90.2				NA	
Molybdenum		4.1				NA	
Sodium		588				NA	
Nickel		19.3				NA	
Lead	5	52800			0.5	88100	
Antimony		16.9				NA	
Selenium	1	2.7	U		0.1	36.0	U
Silicon		242	J			NA	
Vanadium		10.7				NA	
Zinc	1	4180				NA	

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Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 02/03/06

CLIENT: TRUHANFORD RC-020 K0197  
WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0601L127

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-----	-----	-----	-----	-----	-----	-----
-001	J10V68	Silver, Total	1.1	u MG/KG	1.1	6.0
		Aluminum, Total	1100	MG/KG	13.9	6.0
		Arsenic, Total	6.6	MG/KG	2.6	6.0
		Boron, Total	105	J MG/KG	2.0	6.0
		Barium, Total	2350	MG/KG	0.15	6.0
		Beryllium, Total	0.08	u MG/KG	0.08	6.0
		Calcium, Total	19600	MG/KG	9.0	6.0
		Cadmium, Total	10.8	MG/KG	0.53	6.0
		Cobalt, Total	1.4	MG/KG	0.91	6.0
		Chromium, Total	49.7	MG/KG	1.2	6.0
		Copper, Total	165	MG/KG	0.91	6.0
		Iron, Total	9300	MG/KG	24.3	6.0
		Mercury, Total	0.15	MG/KG	0.1	5.0
		Potassium, Total	358	MG/KG	68.2	1.0
		Magnesium, Total	829	MG/KG	10.2	6.0
		Manganese, Total	90.2	MG/KG	0.15	6.0
		Molybdenum, Total	4.1	MG/KG	0.99	6.0
		Sodium, Total	588	MG/KG	3.6	1.0
		Nickel, Total	19.3	MG/KG	0.99	6.0
		Lead, Total	52800	MG/KG	2.4	6.0
		Antimony, Total	16.9	MG/KG	3.0	6.0
		Selenium, Total	2.7	u MG/KG	2.7	6.0
		Silicon, Total	242	J MG/KG	6.2	6.0
		Vanadium, Total	10.7	MG/KG	0.68	6.0
		Zinc, Total	4180	MG/KG	0.38	6.0

*Handwritten:* 3/10/06

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Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 02/03/06

CLIENT: TNUHANFORD RC-020 K0197  
WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0601L127

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-002	J10V68	Silver, TCLP Leachate	14.0	u <sup>g</sup> /L	14.0	1.0
		Arsenic, TCLP Leachate	42.4	UG/L	34.0	1.0
		Barium, TCLP Leachate	412	UG/L	2.0	1.0
		Cadmium, TCLP Leachate	76.6	UG/L	7.0	1.0
		Chromium, TCLP Leachate	19.3	UG/L	16.0	1.0
		Mercury, TCLP Leachate	1.0	u <sup>g</sup> /L	1.0	10.0
		Lead, TCLP Leachate	88100	UG/L	31.0	1.0
		Selenium, TCLP Leachate	36.0	u <sup>g</sup> /L	36.0	1.0

*12*  
*3/10/06*

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## **Appendix 4**

### **Laboratory Narrative and Chain-of-Custody Documentation**

**000013**



## Analytical Report

Client: TNU-HANFORD RC-020  
LVL#: 0601L127  
SDG/SAF#: K0197/RC-020

W.O.#: 11343-606-001-9999-00  
Date Received: 01-20-06

### METALS CASE NARRATIVE

1. This narrative covers the analyses of 1 soil sample and 1 TCLP leachate sample.
2. The samples were prepared and analyzed in accordance with methods checked on the attached glossary.

The soil sample was rerun for Potassium and Sodium, and was reported with a 6-fold dilution for the remainder of the ICP metals. The soil sample was reported with a 5-fold dilution and the TCLP leachate with a 10-fold dilution for Mercury. The TCLP leachate sample was digested with a 10-fold dilution for ICP metals. All dilutions were due to sample matrix.

3. All analyses were performed within the required holding times.
4. All results presented in this report are derived from samples that met LvLI's sample acceptance policy.
5. All Initial and Continuing Calibration Verifications (ICV/CCVs) were within the 90-110% control limits (80-120% for Mercury).
6. All Initial and Continuing Calibration Blanks (ICB/CCBs) were within control limits (less than the PQL).
7. All preparation/method blanks (MB) were within method criteria {less than the Practical Quantitation Limit (3X the IDL), MB value less than 5% of the RCRA limit, or samples greater than 20X MB value}. Refer to the Inorganics Method Blank Data Summary.
8. All ICP Interference Check Standards were within control limits.
9. All laboratory control samples (LCS) were within the 80-120% control limits with the exception of Silicon at 58.4%. Refer to the Inorganics Laboratory Control Standards Report. Associated sample results may be biased low.
10. The matrix spike (MS) recoveries for 8 analytes were outside the 75-125% control limits. Refer to the Inorganics Accuracy Report.

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 21 pages.

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11. For analytes where the ICP MS is out-of-control, a post-digestion MS (PDS) and serial dilution are performed. A PDS was prepared at meaningful concentration level for the following analytes:

<u>Sample ID</u>	<u>Element</u>	<u>PDS</u>	<u>PDS</u>
		<u>Concentration (ppb)</u>	<u>% Recovery</u>
J10V68	Boron	100	100.5
	Barium	1,100	88.4
	Calcium	22,000	89.6
	Copper	100	90.7
	Iron	22,000	95.6
	Lead	10,000	83.0
	Silicon	1,100	100.5
	Zinc	1,100	76.0

12. The duplicate analyses for 1 TCLP leachate analyte and 7 total analytes were outside the 20% Relative Percent Difference (RPD) control limits. Refer to the Inorganics Precision Report.
13. The TCLP extract from sample J10V68 was selected for the matrix spike (MS) for this analytical batch. The matrix spike for Silver was below 50% recovery (28.7%). The recovery in the TCLP Leachate was below 80-120% of the action level so standard addition was not required per Federal Register, Vol.57, No.227, Nov. 24, 1992, page 55117.
14. For the purposes of this report, the data has been reported to the Instrument Detection Limit (IDL). Values between the IDL and the Practical Quantitation Limit (PQL) are acquired in a region of less-certain quantification.
15. LvLI is NELAP accredited by the state of Pennsylvania and holds over 20 additional state accreditations. For a complete listing of accrediting authorities and the corresponding analytes/methods, please contact your Project Manager.
16. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature.

  
Iain Daniels

Laboratory Manager

Lionville Laboratory Incorporated

2/6/06  
Date



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00000007

Washington Closure Hanford		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST						RC-020-004		Page 1 of 21	
Collector Doug Bowers/C. Martinez		Company Contact Doug Bowers		Telephone No. 509-531-0701		Project Coordinator KESSNER, JH		Price Code		Data Turnaround	
Project Designation 100-BC Burial Grounds - Soil Full Protocol		Sampling Location 100-B-20 (1716-B Maint Garage UST)		SAF No. RC-020		Air Quality		14 day			
Ice Chest No. AFS-04-049		Field Logbook No. EFL-1173-7		COA C118X4 A000		Method of Shipment Fed ex					
Shipped To EBERLINE SERVICES (LIONVILLE)		Offsite Property No. A060224		Shipping C118X4 B700		Bill of Lading/Air Bill No. See USPC					
POSSIBLE SAMPLE HAZARDS/REMARKS none < DOT Limits		Preservation		None		Cool 4C		Cool 4C		Cool 4C	
Special Handling and/or Storage Cool 4 degrees centigrade		Type of Container		G/P		aG		aG		G	
		No. of Container(s)		1		1		1		1	
		Volume		250g 1 L		250ml 1 L		250ml 1 L		250ml 1 L	
SAMPLE ANALYSIS		See item (1) in Special Instructions		PCBs - E082		Semi-VOA - 8270A (TCL)		TPH (Total) - 418.1		VOA - 8260A (TCL)	
								Ignit - ability 1010		See Item (2)	
										01/18/06	
Sample No.	Matrix *	Sample Date	Sample Time								
J10V68	SOIL	01/18/06	1400								
J10V69	SOIL	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
J10V70	SOIL										
J10V71	SOIL										
J10V72	SOIL										
CHAIN OF POSSESSION				Sign/Print Names				SPECIAL INSTRUCTIONS			
Relinquished By/Removed From Doug Bowers		Date/Time 1-18-06/1745		Received By/Stored In Acf 70		Date/Time 1-18-06/1745		(1) ICP Metals - 6010 (Client List) (Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium, Silicon, Silver, Sodium, Vanadium, Zinc); Mercury - 7470 - (CV)			
Relinquished By/Removed From R2 Staffer		Date/Time 1-18-06 1125		Received By/Stored In R2 Staffer		Date/Time 1-18-06		(2) metals by ICP (TCLP) - 1311/6010			
Relinquished By/Removed From R2 Staffer		Date/Time 1-20-06 1500		Received By/Stored In Fed Ex		Date/Time 1-20-06		(Arsenic, barium, cadmium, chromium, copper, lead, selenium, silver); mercury (TCLP)			
Relinquished By/Removed From R2 Staffer		Date/Time 1-20-06 0940		Received By/Stored In R2 Staffer		Date/Time 1-20-06		1311/7470			
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time					
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time					
LABORATORY SECTION		Received By		Title		Date/Time					
FINAL SAMPLE DISPOSITION		Disposal Method		Disposed By		Date/Time					

## **Appendix 5**

### **Data Validation Supporting Documentation**

**000017**

## INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT:	100-13-20		DATA PACKAGE: K0197A		
VALIDATOR:	TLT	LAB:	LLI	DATE: 3/8/00	
			SDG: K0197A		
ANALYSES PERFORMED					
SW-846/ICP	SW-846/GFAA	SW-846/Hg	SW-846 Cyanide	TCLP	
SAMPLES/MATRIX					
J10V68					
Soil					

## 1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Technical verification documentation present? ..... Yes ☒ No ☐ N/A

Comments: \_\_\_\_\_

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## 2. INSTRUMENT PERFORMANCE AND CALIBRATIONS (Levels D and E)

Initial calibrations performed on all instruments? ..... Yes ☐ No ☒ N/AInitial calibrations acceptable? ..... Yes ☐ No ☒ N/AICP interference checks acceptable? ..... Yes ☐ No ☒ N/AICV and CCV checks performed on all instruments? ..... Yes ☐ No ☒ N/AICV and CCV checks acceptable? ..... Yes ☐ No ☒ N/AStandards traceable? ..... Yes ☐ No ☒ N/AStandards expired? ..... Yes ☐ No ☒ N/ACalculation check acceptable? ..... Yes ☐ No ☒ N/A

Comments: \_\_\_\_\_

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## INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

## 3. BLANKS (Levels B, C, D, and E)

ICB and CCB checks performed for all applicable analyses? (Levels D, E) ..... Yes No N/A

ICB and CCB results acceptable? (Levels D, E) ..... Yes No N/A

Laboratory blanks analyzed? ..... Yes No N/A

Laboratory blank results acceptable? ..... Yes No N/A

Field blanks analyzed? (Levels C, D, E) ..... Yes No N/A

Field blank results acceptable? (Levels C, D, E) ..... Yes No N/A

Transcription/calculation errors? (Levels D, E) ..... Yes No N/A

Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

## 4. ACCURACY (Levels C, D, and E)

MS/MSD samples analyzed? ..... Yes No N/A

MS/MSD results acceptable? ..... Yes No N/A

MS/MSD standards NIST traceable? (Levels D, E) ..... Yes No N/A

MS/MSD standards expired? (Levels D, E) ..... Yes No N/A

LCS/BSS samples analyzed? ..... Yes No N/A

LCS/BSS results acceptable? ..... Yes No N/A

Standards traceable? (Levels D, E) ..... Yes No N/A

Standards expired? (Levels D, E) ..... Yes No N/A

Transcription/calculation errors? (Levels D, E) ..... Yes No N/A

Performance audit sample(s) analyzed? ..... Yes No N/A

Performance audit sample results acceptable? ..... Yes No N/A

Comments:

boron - 64.2% T all

MS

IC

Silicon - 302.2% T all

MS

IC

Silver - 28.7% T all

MS TCLP

Silicon - 58.4% T all

LCS

no P4

000019

## INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

## 5. PRECISION (Levels C, D, and E)

Duplicate RPD values acceptable? .....	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> N/A
Duplicate results acceptable? .....	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> N/A
MS/MSD standards NIST traceable? (Levels D, E) .....	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> N/A
MS/MSD standards expired? (Levels D, E) .....	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> N/A
Field duplicate RPD values acceptable? .....	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> N/A
Field split RPD values acceptable? .....	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> N/A
Transcription/calculation errors? (Levels D, E) .....	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> N/A

Comments:

Chromium TCLP - 3420 Fall

## 6. ICP QUALITY CONTROL (Levels D and E)

ICP serial dilution samples analyzed? .....	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> N/A
ICP serial dilution %D values acceptable? .....	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> N/A
ICP post digestion spike required? .....	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> N/A
ICP post digestion spike values acceptable? .....	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> N/A
Standards traceable? .....	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> N/A
Standards expired? .....	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> N/A
Transcription/calculation errors? .....	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> N/A

Comments:

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## INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

## 7. FURNACE AA QUALITY CONTROL (Levels D and E)

Duplicate injections performed as required?.....	Yes	No	N/A
Duplicate injection %RSD values acceptable?.....	Yes	No	N/A
Analytical spikes performed as required? .....	Yes	No	N/A
Analytical spike recoveries acceptable?.....	Yes	No	N/A
Standards traceable?.....	Yes	No	N/A
Standards expired? .....	Yes	No	N/A
MSA performed as required? .....	Yes	No	N/A
MSA results acceptable? .....	Yes	No	N/A
Transcription/calculation errors?.....	Yes	No	N/A

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

## 8. HOLDING TIMES (all levels)

Samples properly preserved?.....	Yes	No	N/A
Sample holding times acceptable? .....	Yes	No	N/A

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

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## INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

## 9. RESULT QUANTITATION AND DETECTION LIMITS (all levels)

Results reported for all requested analyses?..... Yes No N/A

Results supported in the raw data? (Levels D, E)..... Yes No N/A

Samples properly prepared? (Levels D, E)..... Yes No N/A

Detection limits meet RDL?..... Yes No N/A

Transcription/calculation errors? (Levels D, E)..... Yes No N/A

Comments:

all silver org ICP + TCLP  
selenium ICP + TCLP

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## **Appendix 6**

### **Additional Documentation Requested by Client**

**000023**

Lionville Laboratory, Inc.

INORGANICS METHOD BLANK DATA SUMMARY PAGE 02/03/06

CLIENT: TNUHANFORD RC-020 K0197  
WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0601L127

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
BLANK1	06L0046-MB1	Silver, Total	0.14 u	MG/KG	0.14	1.0
		Aluminum, Total	1.8 u	MG/KG	1.8	1.0
		Arsenic, Total	0.34 u	MG/KG	0.34	1.0
		Boron, Total	0.27 u	MG/KG	0.27	1.0
		Barium, Total	0.05	MG/KG	0.02	1.0
		Beryllium, Total	0.01 u	MG/KG	0.01	1.0
		Calcium, Total	4.4	MG/KG	1.2	1.0
		Cadmium, Total	0.07 u	MG/KG	0.07	1.0
		Cobalt, Total	0.12 u	MG/KG	0.12	1.0
		Chromium, Total	0.16 u	MG/KG	0.16	1.0
		Copper, Total	0.12 u	MG/KG	0.12	1.0
		Iron, Total	3.2 u	MG/KG	3.2	1.0
		Potassium, Total	54.0 u	MG/KG	54.0	1.0
		Magnesium, Total	1.4 u	MG/KG	1.4	1.0
		Manganese, Total	0.02	MG/KG	0.02	1.0
		Molybdenum, Total	0.13 u	MG/KG	0.13	1.0
		Sodium, Total	2.8 u	MG/KG	2.8	1.0
		Nickel, Total	0.13 u	MG/KG	0.13	1.0
		Lead, Total	0.46	MG/KG	0.31	1.0
		Antimony, Total	0.40 u	MG/KG	0.40	1.0
		Selenium, Total	0.36 u	MG/KG	0.36	1.0
		Silicon, Total	2.7	MG/KG	0.82	1.0
		Vanadium, Total	0.09 u	MG/KG	0.09	1.0
		Zinc, Total	0.05 u	MG/KG	0.05	1.0
BLANK1	06C0013-MB1	Mercury, Total	0.02 u	MG/KG	0.02	1.0
BLANK1	06L0069-MB1	Silver, TCLP Leachate	1.4 u	UG/L	1.4	1.0
		Arsenic, TCLP Leachate	3.4 u	UG/L	3.4	1.0
		Barium, TCLP Leachate	0.38	UG/L	0.20	1.0
		Cadmium, TCLP Leachate	0.70 u	UG/L	0.70	1.0
		Chromium, TCLP Leachate	1.6 u	UG/L	1.6	1.0
		Lead, TCLP Leachate	3.1 u	UG/L	3.1	1.0
		Selenium, TCLP Leachate	3.6 u	UG/L	3.6	1.0
BLANK2	06L0069-MB2	Silver, TCLP Leachate	8.4 u	UG/L	8.4	6.0
		Arsenic, TCLP Leachate	20.4 u	UG/L	20.4	6.0
		Barium, TCLP Leachate	1.2 u	UG/L	1.2	6.0
		Cadmium, TCLP Leachate	4.2 u	UG/L	4.2	6.0
		Chromium, TCLP Leachate	9.6 u	UG/L	9.6	6.0

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Lionville Laboratory, Inc.

INORGANICS METHOD BLANK DATA SUMMARY PAGE 02/03/06

CLIENT: TNUHANFORD RC-020 K0197  
WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0601L127

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
=====	=====	=====	=====	=====	=====	=====
BLANK2	06L0069-MB2	Lead, TCLP Leachate	18.6 u	UG/L	18.6	6.0
		Selenium, TCLP Leachate	21.6 u	UG/L	21.6	6.0
BLANK1	06C0018-MB1	Mercury, Total	0.10 u	UG/L	0.10	1.0
BLANK2	06C0018-MB2	Mercury, TCLP Leachate	0.10 u	UG/L	0.10	1.0

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Lionville Laboratory, Inc.

INORGANICS ACCURACY REPORT 02/03/06

CLIENT: TNUHANFORD RC-020 K0197  
WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0601L127

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR (SPK)
-001	J10V68	Silver, Total	5.8	1.1 u	6.3	92.1	6.0
		Aluminum, Total	1320	1100	253	86.6*	6.0
		Arsenic, Total	249	6.6	253	95.7	6.0
		Boron, Total	186	105	126	64.2	6.0
		Barium, Total	2530	2350	253	71.5*	6.0
		Beryllium, Total	6.2	0.08u	6.3	98.4	6.0
		Calcium, Total	18600	19600	3160	-33. *	6.0
		Cadmium, Total	17.9	10.8	6.3	112.7	6.0
		Cobalt, Total	64.4	1.4	63.2	99.7	6.0
		Chromium, Total	75.0	49.7	25.3	100	6.0
		Copper, Total	219	165	31.6	172.5*	6.0
		Iron, Total	8750	9300	126	-430. *	6.0
		Mercury, Total	2.1	0.15	1.9	103.8	5.0
		Potassium, Total	2960	358	3160	82.4	1.0
		Magnesium, Total	3620	829	3160	88.3	6.0
		Manganese, Total	153	90.2	63.2	99.5	6.0
		Molybdenum, Total	127	4.1	126	97.5	6.0
		Sodium, Total	3130	588	3160	80.3	1.0
		Nickel, Total	85.0	19.3	63.2	104.0	6.0
		Lead, Total	63900	52800	63.2	17450 *	6.0
		Antimony, Total	78.1	16.9	63.2	96.8	6.0
		Selenium, Total	246	2.7 u	253	97.5	6.0
		Silicon, Total	624	242	126	302.2	6.0
		Vanadium, Total	69.1	10.7	63.2	92.4	6.0
		Zinc, Total	3090	4180	63.2	-1700. *	6.0

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Lionville Laboratory, Inc.

INORGANICS ACCURACY REPORT 02/03/06

CLIENT: TNUHANFORD RC-020 K0197  
WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0601L127

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR (SPK)
-002	J10V68	Silver, TCLP Leachate	14400	14.0 u	50000	28.7	1.0
		Arsenic, TCLP Leachate	48800	42.4	50000	97.4	1.0
		Barium, TCLP Leachate	921000	412	000000	92.1	6.0
		Cadmium, TCLP Leachate	10300	76.6	10000	102.5	1.0
		Chromium, TCLP Leachat	52000	18.3	50000	104.0	1.0
		Mercury, TCLP Leachate	171	1.0 u	200	85.6	50.0
		Lead, TCLP Leachate	143000	88100	50000	109.3	1.0
		Selenium, TCLP Leachat	9180	36.0 u	10000	91.8	1.0

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Lionville Laboratory, Inc.

INORGANICS PRECISION REPORT 02/03/06

CLIENT: TNUHANFORD RC-020 K0197  
WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0601L127

SAMPLE	SITE ID	ANALYTE	INITIAL			DILUTION FACTOR (REP)
			RESULT	REPLICATE	RPD	
-----	-----	-----	-----	-----	-----	-----
-001REP	J10V62	Silver, Total	1.1 u	1.1 u	NC	6.0
		Aluminum, Total	1100	1100	0.054	6.0
		Arsenic, Total	6.6	8.9	29.7	6.0
		Boron, Total	105	77.9	29.4	6.0
		Barium, Total	2350	2610	10.5	6.0
		Beryllium, Total	0.08u	0.08u	NC	6.0
		Calcium, Total	19600	16900	15.1	6.0
		Cadmium, Total	10.8	12.5	14.6	6.0
		Cobalt, Total	1.4	1.9	30.3	6.0
		Chromium, Total	49.7	60.5	19.6	6.0
		Copper, Total	165	186	12.0	6.0
		Iron, Total	9300	9890	6.2	6.0
		Mercury, Total	0.15	0.12	19.6	5.0
		Potassium, Total	358	358	0.14	1.0
		Magnesium, Total	829	727	12.2	6.0
		Manganese, Total	90.2	106	15.8	6.0
		Molybdenum, Total	4.1	5.1	21.7	6.0
		Sodium, Total	544	482	19.9	1.0
		Nickel, Total	19.3	26.3	30.7	6.0
		Lead, Total	52800	61500	15.2	6.0
		Antimony, Total	16.9	17.3	2.3	6.0
		Selenium, Total	2.7 u	2.8 u	NC	6.0
		Silicon, Total	242	304	23.0	6.0
		Vanadium, Total	10.7	7.2	39.1	6.0
		Zinc, Total	4180	3550	16.3	6.0

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Lionville Laboratory, Inc.

INORGANICS PRECISION REPORT 02/03/06

CLIENT: TNUHANFORD RC-020 K0197  
WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0601L127

SAMPLE	SITE ID	ANALYTE	INITIAL RESULT	REPLICATE	RPD	DILUTION FACTOR (REP)
-002REP	J10V68	Silver, TCLP Leachate	14.0 u	14.0 u	NC	1.0
		Arsenic, TCLP Leachate	42.4	45.1	6.2	1.0
		Barium, TCLP Leachate	412	436	8.8	1.0
		Cadmium, TCLP Leachate	76.6	77.4	1.0	1.0
		Chromium, TCLP Leachate	18.3	25.8	34.0	1.0
		Mercury, TCLP Leachate	1.0 u	1.0 u	NC	10.0
		Lead, TCLP Leachate	88100	93500	6.0	1.0
		Selenium, TCLP Leachate	36.0 u	36.0 u	NC	1.0

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Lionville Laboratory, Inc.

INORGANICS LABORATORY CONTROL STANDARDS REPORT 02/03/06

CLIENT: TNUHANFORD RC-020 K0197  
WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0601L127

SAMPLE	SITE ID	ANALYTE	SAMPLE	SPIKED AMOUNT	SPIKED UNITS	%RECOV
=====	=====	=====	=====	=====	=====	=====
LCS1	06L0046-LC1	Silver, LCS	49.0	50.0	MG/KG	98.0
		Aluminum, LCS	492	500	MG/KG	98.5
		Arsenic, LCS	922	1000	MG/KG	92.2
		Boron, LCS	478	500	MG/KG	95.7
		Barium, LCS	492	500	MG/KG	98.3
		Beryllium, LCS	24.3	25.0	MG/KG	97.2
		Calcium, LCS	2420	2500	MG/KG	96.9
		Cadmium, LCS	23.9	25.0	MG/KG	95.6
		Cobalt, LCS	240	250	MG/KG	96.1
		Chromium, LCS	49.2	50.0	MG/KG	98.4
		Copper, LCS	127	125	MG/KG	101.4
		Iron, LCS	495	500	MG/KG	99.0
		Potassium, LCS	2120	2500	MG/KG	84.9
		Magnesium, LCS	2290	2500	MG/KG	95.8
		Manganese, LCS	75.1	75.0	MG/KG	100.1
		Molybdenum, LCS	498	500	MG/KG	99.5
		Sodium, LCS	2150	2500	MG/KG	86.1
		Nickel, LCS	194	200	MG/KG	97.1
		Lead, LCS	241	250	MG/KG	96.4
		Antimony, LCS	286	300	MG/KG	95.4
		Selenium, LCS	897	1000	MG/KG	89.7
		Silicon, LCS	292	500	MG/KG	58.4
		Vanadium, LCS	246	250	MG/KG	98.4
		Zinc, LCS	95.4	100	MG/KG	95.4
LCS1	06C0013-LC1	Mercury, LCS	6.1	6.2	MG/KG	98.8
LCS1	06L0069-LC1	Silver, LCS	504	500	UG/L	100.9
		Arsenic, LCS	9960	10000	UG/L	99.6
		Barium, LCS	5020	5000	UG/L	100.3
		Cadmium, LCS	269	250	UG/L	107.4
		Chromium, LCS	542	500	UG/L	108.4
		Lead, LCS	2590	2500	UG/L	103.6
		Selenium, LCS	9380	10000	UG/L	93.8
LCS1	06C0018-LC1	Mercury, LCS	5.1	5.0	UG/L	101.4

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